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THE MONIST.

OUGHT THE UNITED STATES SENATE TO BE ABOLISHED?[1]

WHEN the gigantic intellect of Napoleon began to stagger and reel under the weight of his successes, he is said to have boasted that he would make his dynasty the oldest in Europe. In 1787 this Republic was the youngest State. To-day it is in a most essential respect by far the oldest: its constitution—if the word be understood in its strict and proper sense—antedates by many years all other constitutions. If this had been foretold by a prophet, when on the 25th of May, eleven days after the appointed time, the "convention of delegates . . . . for the sole and express purpose of revising the Articles of Confederation" could at last proceed to business by organising itself, it would have appeared a wilder prediction than the mad threat of the demoniacal Corsican. "We may indeed, with propriety, be said to have reached almost the last stage of national humiliation. There is scarcely anything that can wound the pride, or degrade the character of an independent nation, which we do not experience . . . . what indication is there of national disorder, poverty, and insignificance, that could befall a community so peculiarly blessed with natural advantages as we are, which does not form a part of the dark catalogue of our public misfortunes?" Thus Hamilton characterised in the *Federalist* (No. XV, Dawson's edit.) the actual condition of things, while the people held the adoption or re-

[1] Oration delivered on the Fourth of July at the University of Chicago.

jection of the work of the federal convention under advisement, and Washington endorsed again and again this harsh judgment to its fullest extent. Luther Martin, however, was of opinion that the people would seal their own doom and that of their posterity by accepting the proffered gift of the convention. He wrote: "I would reduce myself to indigence and poverty; and those who are dearer to me than my own existence I would intrust to the care and protection of that Providence who hath so kindly protected myself,—if on *those terms only* I could procure my country to reject those chains which are forged for it." (*Elliot*, I, 389.) His warning was not heeded. The people deliberately fastened the chains to their limbs,—they and their posterity have worn them one hundred and five years glorying in them the longer the more,—the chains, in spite of all their alleged and real flaws, have withstood the strain of the greatest civil war recorded in history and grown infinitely stronger than before,—they have been worked as a drag-net hauling to a thinly settled coast-strip a whole continent,—and in wearing them and by wearing them, the people have pushed themselves ever more vigorously into the very front rank of the leading nations of the earth as to everything that renders life worth living for. Surely, the people of the United States have a right to say, and the nations of the earth ought to say with them: would that such chains had been forged more frequently. If the people of the United States ever cease to say so—to say so not merely with their lips, but from the very depth of their hearts and with full consciousness of its whole import, they will have forfeited the right to celebrate the Fourth of July. On the Fourth of July their forefathers merely proclaimed their right to be free and independent and the intention to assert the right; and by a seven year's war they vindicated this step to the extent of proving their ability to conquer independence. This, however, was only the first and the easier half of the task they had assumed. Independent and free are not equivalent terms, and unless they proved themselves capable of becoming and remaining free, their making themselves independent was a wrong done to themselves. The prerequisite of this proof, however, was a much harder and grander victory—a victory over them-

selves. This they achieved in the adoption of the Constitution. Therefore only by the adoption of the Constitution was the Fourth of July rendered a festive day for humankind.

That the handful of men at Philadelphia, anxiously devising behind closed doors the means to infuse enduring vitality into the federative Republic, must forever be counted among the greatest lawgivers known to history, is therefore no more an arguable question. In the nature of things, there is but one adequate test of constitutions—success. Their work has stood this test over a century. Nothing can undo this fact, and consequently, whatever the future may have in store for this Republic, their names are indelibly inscribed in the imperishable plates of history as sages and benefactors of mankind. But let us beware lest justice to them mislead us into injustice towards others. They could only devise the proper means for realising the great possibilities offered by the circumstances. Unless the people had sufficient discernment to see that they had planned wisely, and had, moreover, all the qualities required for applying the proper means in the proper manner, they had labored in vain. The realisation of the possibilities depended altogether on the people. This is a trite truth, but a truth of tremendous import. To lose sight of it, is to vow the country to perdition. There is no surer way to bring it about than to erect the Constitution into a fetish, expecting from it safety and prosperity so long as incense is offered to it. Though the Constitution is a master-work, in itself it is of no more use than an armor wrought of gossamer. Only so far as the people vitalise it in the proper manner by what they do and by what they abstain from doing, is it a guaranty that the future will correspond to the past. The history of the Union during the years preceding the adoption of the Constitution is, however, irrefutable proof that it will not do to invert the proposition. It would be midsummer madness to assert that as long as the people are all right, it is indifferent what their Constitution is. While it is the immortal glory of the past generations to have made the Constitution a success hardly equalled by any other and certainly surpassed by none, the Constitution has to an incalculable degree been instrumental in rendering the people capa-

ble of doing it. To indulge in rash criticisms, paving the way for a spirit of impatient and venturesome innovation, is, therefore, no less a danger than erecting the Constitution into a fetish. To the happy blending of steadfast and conscious conservatism with determined, but level-headed and prudent progressiveness, as described by Madison in No. XIV of the *Federalist,* do the American people owe their greatness. If this ceases to be the distinguishing trait of the national character, the republic has passed its zenith and is gliding down on an inclined plane, though every year add a million to its inhabitants and a hundred millions to its wealth.

I am confident that to-day an overwhelming majority of the American people will still readily assent to these assertions. But is the number of those not increasing with alarming rapidity who, in one respect or another, do so only "in the abstract"—as they used to say in the old slavery days? To enumerate and discuss all these signs of the times would require days. I must confine myself to calling attention to but one—from certain points of view, in my opinion, the most characteristic as well as the most startling one.

Whether it be justified or not, it is an undeniable and patent fact that the federal Senate has of late years steadily lost ground in the public esteem. By the spectacle offered by it while the repeal of the purchasing clause of the Sherman law was at issue and by its attitude in regard to the revision of the tariff, with the incidental revelations, it has succeeded in arousing an odium, which at any previous period of the country's history would have appeared an utter impossibility. Not only individual Senators have been visited with the keenest censures, but the Senate has been held up by many writers as a fit object of indignation and contempt. Threats that, if it did not mend its ways, it would surely bring down upon itself the fate which would unquestionably overtake the British House of Lords in a near future, have not been uncommon. Others, remembering how difficult the Constitution rendered the fulfilment of this threat, have at least expressed a lively regret that this anachronism, bent upon becoming ever more and more a stupendous failure, could not be consigned to the historical lumber-room. Assuming that all these numerous writers really thought what they wrote, the academi-

cal expressions of their personal opinions would by this time certainly have taken shape in an earnest and systematic political agitation, if the formidable obstacle of the last clause of Article V of the Constitution was not in the way. But though the obstacle is formidable, it is not insurmountable. If ever a large majority of the American people should become fully convinced that the Senate ought to be abolished, this clause will not prevent its being done. In spite of the probable protests of the minority, the majority will then decide that the clause has no reference to this question, and if unanimity of the States be not required, an amendment to this effect could be carried like any other amendment. The clause does not impose the incubus of the Senate *in perpetuum* upon the American people. It merely renders a change of its composition practically impossible, while it is allowed to exist. *Sit ut est, aut non sit,* is the imperative decree. Whosoever is with Mr. Moncure D. Conway of opinion "that in our Senate are historically embodied the most antiquated principle of State sovereignty, . . . the 'rotten borough' principle, the peerage principle, and the base attempt to fetter posterity to these unrepublican and irrational principles, by all of which the United States is held far behind Western Europe in constitutional civilisation," (*The Open Court,* March 15, 1894,) can therefore not consistently hold (with him) that "the entire abolition of the Senate 'does not come' within the range of practical politics." Irrespective of what the chances of success during his lifetime might be, he owes it to himself, as a good patriot, to exert himself to the utmost to have this vicious receptacle of "American snobbery" rased to the ground. Nor—as I shall try to prove later on—is the certainty of the futility of all such exertions for some time to come a valid reason for refraining from a serious examination of the question, whether he and those who more or less agree with him, are right in asserting that the Senate is a pernicious incubus fastened upon the republic by the shortsightedness, the narrow prejudices, and the self-seeking provincialism of the authors of the Constitution.

Logical gymnastics on the field of politics have been for generations the most keenly relished intellectual sport of the American

people, but as a rule their mistaking them for statesmanship has been merely apparent. They have been greatly prone to prop their eminently realistic statecraft with subtle theorising and displayed great skill in this not always harmless art. But their inborn realism and vigorous common sense have most effectively guarded them against allowing themselves to be wafted on by the treacherous winds of plausible theories. Unless they have sadly changed in this respect they will also, as to the question in hand, not accept as satisfactory an answer furnished by theoretical deductions and conclusions, but look squarely at the hard facts, remembering that "in political arithmetic, two and two do not always make four." (*The Federalist*, No. XXI.)

First in order among the pertinent facts stands the historical genesis of the Senate. Mr. Conway writes as to this:

"The Constitution of 1787 was really a treaty between thirteen sovereigns, the smaller empires refusing to unite unless their inherited supremacies were secured the power to overrule the voice of the nation. This was the real foundation of the Senate. But in the discussions of the Convention (1787) that doctrine of sovereignty . . . was veiled, though the veil was as discreditable as the motive concealed. The necessity being first of all to get the second Legislature established in the Constitution, it was done with an innocent air, and without discussion, on the mere statement that England had two Houses, and that two Houses had always proved favorable to liberty. . . . But worse remained. When the subject of disproportionate representation in the Senate came before the Convention, it was supported as a principle only [!] on the ground that in the British Parliament small places with little population were represented equally with the largest constituencies. . . . Furthermore, besides being 'in the European fashion' . . . it [the Senate] has been as a fashion repeated in all the States."

Mr. Conway is a historian and must be presumed to be familiar with the original sources bearing upon the subject. It would, however, be hard to find a more glaring perversion of the plain historical facts. That it is not a wilful falsification, goes without saying. Mr. Conway is one of those historians who, as to certain questions, are constitutionally unable to correctly see the contents of their documents. There is such a thing as historical color-blindness. Put any amount of green before them, to them it will be gray or red.

There was nothing whatever "veiled" about this question in

the Convention. The third of Randolph's "resolutions"—the first plan submitted to the Convention and furnishing the original basis for its discussions—read thus: "Resolved, that the national Legislature ought to consist of two branches." Randolph was a delegate of Virginia, at that time the foremost State of the Union. To suppose that his resolution concealed the sinister intention to clear the way for the "rotten borough system," is, therefore, to suppose a self-evident absurdity.—Article II of Charles Pinckney's plan, submitted the same day to the Convention, read thus: "The legislative power shall be vested in a Congress, to consist of two separate Houses; one to be called the House of Delegates, and the other the Senate." Pinckney was a delegate of South Carolina, and South Carolina also did not think so meanly either of her actual or of her prospective rank in the Union that she can be suspected of the clandestine purpose to prepare a snug berth for herself in the quality of rotten borough. In the committee of the whole, states Madison in his *Debates in the Federal Convention*, Randolph's third resolution "was agreed to without debate or dissent, except that of Pennsylvania,—given probably from complaisance to Dr. Franklin, who was understood to be partial to a single House of Legislation." (*Elliot*, V, 135.) Three weeks later Pennsylvania, too, gave in its adhesion. Thus, if Mr. Conway's assertions be true, we have the odd spectacle of *all* the States conspiring to "veil" their unanimous intention to smuggle into the Constitution "the rotten borough system," which the larger States afterwards so strenuously contended against. What strange things men will do, when they are pursuing "base" projects.

There is, in fact, but one veil in this case and that is drawn over Mr. Conway's eyes. He pins it to his cap with the erroneous assumption that the States have "as a fashion repeated" the federal Senate. That is hitching the cart before the horse. It is repeatedly and explicitly stated in the debates of the convention that it repeated the "fashion" set by all the States with the exception of Pennsylvania. "In two parts," said Mason of Virginia, "he was sure it (the mind of the people of America) was well settled,—first, in an attachment to republican government; secondly, in an attachment

to more than one branch in the Legislature. Their constitutions accord so generally in both these circumstances, that they seem almost to have been preconcerted. This must either have been a miracle, or have resulted from the genius of the people." (*Elliot*, V, 216, 217.) Unquestionably the latter. "The bicameral system," writes Dr. Lieber, "accompanies the Anglican race like the common law." (*On Civil Liberty and Self-Government*, p. 197.)

This was and is the real foundation of the Senate: the conviction pure and simple—based not only upon the English precedent, but also upon their own experiences—that the bicameral system is preferable to the unicameral. To make the Senate besides a representation of Statehood was altogether an afterthought, gradually evolved by the necessity of a compromise between the large and the small States; and even then the Convention made it only the formative, but not also the really determinative principle, for it deliberately discarded its most obvious and most important logical consequence, the vote by States. According to Randolph's resolutions "the members of the second branch of the national Legislature" were "to be elected, by those of the first, out of a number of persons nominated by the individual Legislatures." In Pinckney's plan the Legislatures were not given any share in the formation of the Senate. It simply provided: "The Senate shall be elected and chosen by the House of Delegates."[1] But while—so far as we can learn from the extant sources—the thought of making the Senate a representation of the States as such was at first not entertained by a single member, several of the most prominent members strongly

[1] The members of the House of Delegates Pinckney wished to have elected by the Legislatures. (*Elliot*, V, 163, 164.) See Madison's explanation of the discrepancy between this opinion and Pinckney's "Plan" (*ibid.* V, 578, 579). R. Sherman advocated the same idea, avowedly because of his distrust of the people. "The people," he said, "immediately, should have as little to do as may be about the Government. They want information, and are constantly liable to be misled" (*ibid.* V, 136). Don't let us judge him too harshly for that. Jefferson, "the father of American democracy," wrote to Madison (Dec. 20, 1787): "I like the power given the Legislature to levy taxes, and for that reason solely (!), I approve of the greater House being chosen by the people directly. For though I think a House so chosen, will be very far inferior to the present Congress, will be very illy qualified to legislate for the Union, for foreign nations, etc., yet this evil does not weigh against the good, etc." (*Jefferson's Works*, II, 328.)

emphasised from the outset, (1) that, as Madison expressed it, the Convention ought to adopt "the policy of refining the popular appointments by successive filtrations" (*Elliot*, V, 137); (2) that, as Randolph said, "the number of the second branch ought to be much smaller than that of the first; so small as to be exempt from the passionate proceedings to which numerous assemblies are liable" (*ibid.* V, 138); (3) that the representation in the two branches ought to be put upon an essentially different basis. As to the latter point, the prevailing opinion evidently was that the Senate should be more especially "the representation of property." (*Ibid.* V, 166, 247, 260, I, 507.) Gerry expressed the hope that the election of senators by the Legislatures would tend "to provide some check in favor of the commercial interest against the landed; without which, oppression will take place." (*Ibid.* V, 168.)

In the course of the discussions some zealous advocates of only one chamber arose. Their arguments, however, so far from calling for some restricting qualifications of the statements made before in regard to this question, only serve as a further corroboration of them. Roger Sherman and Luther Martin admitted that the bicameral system is the only proper one for a State. They insisted upon one chamber for the Union solely because they were opposed to its being transformed into a State in the true sense of the word, but wanted it to remain what it was under the Articles of Confederation—a mere confederacy. (*Elliot*, V, 218; I, 359, 360.)

They reasoned correctly. If the Union was to remain a confederacy a Legislature of two branches was not only useless, but utterly inadmissible. Though the members of the legislature of a confederacy be legislators in name and form and according to the letter of the law, to the extent that the confederacy is really but a confederacy they can be virtually only ambassadors. Ambassadors however, are bound to voice the mind of another. Therefore it would be strictly a *non sense* for the principal to appoint two sets of ambassadors. To say that the unicameral system would have been a necessity if the Union was to remain a confederacy, is, however, not to say that its introduction now would reverse the evolutionary process and re-change the republic into a mere confederacy. No

other change in the legal character of the bond of union being intended, exactly the opposite would necessarily ensue, after we have been over a century legally a nation and actually become so ever more and more. Complete consolidation would be the inevitable consequence, and complete consolidation is incompatible with the maintenance of liberty. They are grossly mistaken who suppose that the abolition of the Senate would only amend the Constitution. It involves in the strict sense of the word a *radical* change of it, i. e. its total subversion. The day on which the radical visionaries triumph, who see in the Senate a gangrenous ulcer on the body politic, will be the beginning of the end of the Republic.

That this change of the Constitution would necessitate a number of other far-reaching changes is easily proved. What, for instance, is to become of impeachments? If they are not to be done away with, another tribunal for trying them would have to be instituted. The former course would hardly be deemed advisable, though many will agree with the late Justice Miller that impeachment "as an efficient remedy must be conceded to be a failure." The same eminent jurist was of opinion that it "has, perhaps, operated as a safety-valve in cases of great popular excitement," (*Lectures on the Constitution of the United States*, page 25,) and that is certainly worth something. Greater difficulties would present themselves in regard to a much more important function of the Senate. Should the Executive be wholly liberated from the control now exercised by the Senate in regard to the management of the international relations? This would surely not be advocated by many. To transfer this function simply to the House of Representatives, all of whose members are elected anew every second year, would however be still less advisable.[1] Though *The Federalist* is over a hundred years old, it can still be studied with considerable profit by the wisest of us. The day on which the reasonings of its authors on this head fail to carry conviction to the American people,

[1] "Foreign governments can never enter into any permanent arrangements with one whose councils and government are perpetually fluctuating. . . . Caprice is just as mischievous as folly, and corruption scarcely worse than perpetual indecision and fluctuation." (Story, *Commentaries*, § 717.)

would not deserve to be entered with red ink in their annals. These problems—and a considerable number could be readily added—suffice to show that the abolition of the Senate is too intricate a question to be satisfactorily disposed of in one column of a daily paper or even in twenty pages of a magazine. But though they are of no little consequence, they are after all only questions of detail, on which it is not necessary to dwell. If it can be proved that the abolition of the Senate would break down the very foundation of our whole political structure, nothing more is needed; and I think this can be proved.

In the Senate, says Pomeroy, "have we fast anchored in our fundamental law the principle of local self-government." (*An Introduction to the Constitutional Law of the United States*, page 121.) This principle is the vital force not only of Anglican, but also of Germanic liberty. Cease to guard and foster it, and the days of this liberty are as surely counted as a plant must wither and die, whose roots are cut off. Up to the days of the third republic, the French failed to realise that the prerequisite of liberty as to the State is local self-government. This was the main cause that, however heroic, their efforts to establish liberty were from the start doomed to be spasmodic and to run straight towards a disastrous reaction. The "liberty trees" they planted were no trees at all, but rootless poles.

But, it will be said, to treat Americans to these hackneyed truths is to carry owls to Athens. Though it must be admitted that in the Senate the principle of local self-government is anchored fast in our fundamental law, it is manifestly preposterous to assert that by the abolition of the Senate this principle would be swept from the American continent into the ocean. True enough. Only do not forget that the history of empires abounds with instances of forms allowed to remain intact and the spirit driven out of them as thoroughly as if they had never harbored so much as the shadow of any spirit. Rome still had its consuls and its senators when the Cæsar's horses could aspire to these dignities. And a federal legislature of only one chamber is certain to prove a besom of steel wire as to the sweeping out of the spirit of true local self-government.

Will it be asserted that this is idle croaking, because England, the mother country of this Republic, has practically but one legislative chamber, and local self-government as well as liberty are housed safely enough in the British Isles? I ask in reply, is there any analogy between those dots in the ocean and this continent, whose inhabitants, composed of nearly all the races of the earth, are sure to be counted by hundreds of millions within the lifetime of more than one baby of to-day? Besides, as to one most essential respect, it is not true that England has practically but one legislative chamber If the lords are good for nothing else, they render Great Britain the eminent service of having it in their power at any moment to compel the House of Commons and the English people to bethink themselves, to take time, to give "the sober second thought" a fair chance to assert itself. Read the debates of the federal convention and of the ratification conventions and *The Federalist*, and you will soon find out whether this was not one of the most essential functions, nay, pre-eminently *the* function assigned by the fathers of the Constitution to the Senate. Moreover, up to a recent date the character of the English government has been essentially aristocratic. How the old machinery of its so-called Constitution will work in the long run after thorough democratisation, is a question for the future to answer. Thus much, however, is revealed very clearly already, that things will not go on so smoothly as they have done heretofore. In many respects the value of the older political experiences of England as political lessons in the sense of precedents to be relied upon diminishes steadily and rapidly. As to the question in hand, there are other historical precedents available, which are more to the purpose and more instructive.

Is it an accident that, as Dr. Lieber says, "no one attempt at introducing the unicameral system, in larger countries, has so far succeeded? France, Spain, Naples, Portugal,—in all these countries it has been tried, and everywhere it has failed." (*On Civil Liberty and Self-Government*, page 197.) I admit that this is partly attributable to the peculiar character of these nations. But that they preferred the unicameral system is chiefly due to a particular trait of their character, and the unicameral system would, so to say, by

main force, inoculate this trait into the American character, and, though the American character is naturally strongly averse to it, the virus would in the nature of things work its way into the whole system and every year gain in potency.

"The idea of one house," says Dr. Lieber in the paragraph quoted before, "flows from that of the unity of power, so popular in France." Unity of power, however, is incompatible with liberty. Whether it be lodged in one, some, or all, makes no difference, or rather the larger the number with whom it rests, the greater the incompatibility, because the sense of personal moral responsibility is correspondingly blunted. To deny this incompatibility is to contend that there is no necessity for human nature to assert itself in human affairs. It is a gross fallacy that governmental powers, which are liable to abuse, ought not to be suffered, for the conception of society presupposes governmental powers and governmental powers not liable to abuse is a contradiction in terms. But it is a still grosser fallacy that unity of power is an irrefragable logical conclusion of the doctrine of popular sovereignty. Whoever says people, says organisation ; whoever says organisation, says complexity; whoever says complexity, says division of energy. Power is real power only to the extent that it can become active. The people are the source of all power, but they do not from choice only refrain from vitalising the power in such a manner that there is actually unity of power ; the nature of things renders it impossible. If it were possible, the doing it would be in itself the dissolution of society, for there would be no more organisation.

But however that be, the size of modern States has rendered democracies in the strict sense of the word impossible. Whether the people like representative government or not, they have no choice. But if this be so, what does the unity of power then signify, if not that the people deliberately set a master over themselves? "By no means," the radical visionary will reply ; "the representatives have of course to voice the will of their constituents." I ask : shall they be real representatives or merely phonographs? If the latter, Dahomey might be a more eligible country to live in than the United States. Besides, we are here again confronted by phys-

ical impossibilities. The people are able to make their will known to the extent of electing a Democrat, a Republican, or a Populist, and bidding them work for tariff reform or protection, for free coinage of silver or the gold standard, and so forth. But how about the details of which all legislation necessarily consists? As to these the will of the constituents cannot be ascertained. It is true, many newspaper-editors always know exactly what it is. The trouble, however, is that rarely any two of them agree.

"Granted as to the difficulty about the details," my imaginary opponent will say; "but that cannot be decisive, for at the next election the people will make known in no uncertain way, whether the representative has done what they wanted him to do." People who are perverse enough to think that in the elections they are frequently confined to a choice between evils will not derive from this as much consolation as our theorist. But apart from that. How about the mischief done in the mean time by the passing of laws calculated or even intended to render the Legislature the master of the people? The laws can be repealed, but the harm they have wrought, is done. An ounce of prevention is better than a pound of cure. This old English proverb contains the larger and better half of all true political wisdom.

"Ah, there I have you," I expect my friend to say. "Your democracy is of a very flimsy kind. You have no faith in the people. If the fountain be pure, the water in the river will run clear."

Yes, you have got me, but with me you have got the authors of the Constitution, the fathers of the country. In the sense you imply the fountain is not, never has been, nor ever will nor can be, pure; and you propose systematically and with ever increasing vigor to stir up all there is of sand and mud in it.

"It is an unquestionable truth," said Hamilton in the ratification convention of New York, "that the body of the people, in every country, desire sincerely its prosperity; but it is equally unquestionable, that they do not possess the discernment and stability necessary for systematic government. To deny that they are frequently led into the grossest errors by misinformation and passion,

would be a flattery which their own good sense must despise." (*Elliot*, II, 302.)

"Oh, Hamilton, the monarchist!" That would probably be all the answer vouchsafed to this quotation. Well, if the country had never had worse Republicans than Alexander Hamilton, its records would well bear inspection. But let us hear Madison, who was never suspected of being a monarchist. He said: "In order to judge of the form to be given to this institution (the Senate), it will be proper to take a view of the ends to be served by it. These were, first, to protect the people against their rulers; secondly, to protect the people against the transient impressions into which they themselves might be led." (*Elliot*, V, 242.)

Since when has it become a political heresy in this country that the people ought to protect themselves against their rulers? Or have we relapsed into the old puerile notion that only from the Executive any dangers are to be apprehended? "The Executive, in our governments," wrote Jefferson, March 15, 1789, to Madison, "is not the sole, it is scarcely the principal object of my jealousy. The tyranny of the Legislatures is the most formidable dread at present, and will be for many years." (*Jefferson's Works*, III, 5.) The most ruthless tyranny recorded in history was exercised in France by the Convention under the lead of the Terrorists. But nothing could be further from the truth than to suppose that the majority of the members of the Convention or even but a very considerable part of them were fiends. Because they were *men* they were driven by the terrible circumstances, partly bequeathed to them by the past and partly of their own creating, to act as if they were devils. *Men* also our representatives must of necessity be, and though individuals might successfully resist the current that would be created by our becoming converts to the doctrine of the unity of power, a numerous body of men could not do so for any length of time; though every single member were a Solon and Aristides combined, their joint weight would force them to drift with it, and drifting with it they would be compelled by their very weight to let themselves be carried along by it with ever increasing velocity. "To check the inherent bent of every government towards the dominant form im-

pressed upon it,"[1] Mirabeau declared to be one of the principal tasks of true statecraft, and the history of the French Revolution from its first to its last page is one continuous corroboration of this assertion written in letters of blood and living fire. Unchecked radical democracy, however, would be the dominant form impressed upon our government by the adoption of the unicameral system; and from the day of its adoption the history of the United States would, therefore, become a fearfully impressive sermon upon the text that "lead us not into temptation" is the prayer of prayers, of which legislative bodies and nations stand even infinitely more in daily need than individuals. The Legislature and the people would mutually push each other on in the mad race on the inclined plane. The Legislature could not check itself, though it were ever so willing and anxious to do so; the people would prevent its doing it. If the fathers of the country had reason to fear "the turbulence and follies of democracy" and "the mischievous influence of demagogues" (*Elliot*, V, 138), surely we have ampler reasons to beware of them and throw up ramparts against them. All over the Christian world the modern economical evolutions have ploughed the ground for them to the very bed-rock. The delusion of the omnipotence of legislation—the deadliest bane of liberty and all sound progress—is getting more and more rampant. Look at our Populists, at our Coxeyites, and you will be in no doubt as to whether we are exempt from the epidemic. Already hundreds of thousands of our citizens keep their hot eyes riveted upon Washington, the Mecca whence all blessings can come and must be made to come. Simplify legislation by entrusting it to one body, and the devout pilgrims will swarm to it—bodily or in the form of petitions, resolutions, platforms—like clouds of locusts. Remember, then, that already years ago the Grand Master of the Knights of Labor was invited kindly to favor Congress with his views on the best manner of solving the social problem, and that there were this year members of Congress advocating that the Coxeyites should be granted a deferential hearing, and go over the pages of the statute books—

[1] Méjan, *Collection complète des travaux de Mirabeau*, III, 366.

federal and State—and you will get no uncertain answer to the question, whether or no the pilgrims will know how to make themselves heard.

Nor could all the other provisions and checks of the Constitution afford us any adequate protection. If ever a political truth was proclaimed, Gouverneur Morris uttered it when he wrote to Timohty Pickering (December 22, 1814):

"But, after all, what does it signify that men should have a written constitution, containing unequivocal provisions and limitations? The legislative lion will not be entangled in the meshes of a logical net. The legislature will always make the power which it wishes to exercise, *unless it be so organised as to contain within itself the sufficient check. Attempts to restrain it from outrage, by other means, will only render it more outrageous.*" (*Elliot*, I, 507.)

The veto-power of the President would soon only render bad worse. It would be extinguishing a fire by screwing the hose of the engine to an oil-tank. Strife between the two powers would be the regular order of the day, as it was in the French Revolution, unless they pulled at the same rope, and then they would pull the republic only all the faster over the brink of the precipice. A "fatal conflict,"[1] or as fatal a co-operation, would soon be the only alternative.

"Tripartite division in the power of legislation—so at the time wrote Madison, so thought all the great builders of the Constitution, so asserted John Adams with vehemence and sound reasoning—is absolutely essential to the success of a federal republic; for if all the legislative powers are vested in one man or in one assembly, there is despotism; if in two branches, there is a restless antagonism between the two; if they are distributed among three, it will be hard to unite two of them in a fatal strife with the third." (*Bancroft*, II, 328.)

He who demurs to this statement of Bancroft reads the history of the United States with eyes that would blot the sun from the skies, because it has spots.

The political physicians, who propose to deliver us from our ailings by the abolition of the Senate, imitate Dr. Eisenbart, of the German student's song, curing toothache most effectively forever and a day by cutting the patient's head off. And their methods bear even a much closer resemblance to those of their famous prototype.

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[1] Bancroft, *History of the Formation of the Constitution*, II, 16.

He made the blind walk again, and restored the eyesight to the lame. That is exactly what they propose to do, and it is mainly for this reason that a serious discussion of the question is imperatively called for, though it is an absolute certainty that for many a year to come their recommendations will not be acted upon.

It is not the first time that the Senate has been complained of. Even the very charge, which is now for nearly a year running every day through the press, was brought against it exactly a century ago by Jefferson. "The failure of the Non-importation Bill" in the Senate caused him to write on May 15, 1794, to Madison:

> "This body was intended as a check on the will of the Representatives when too hasty. They are not only that, but completely so on the will of the people also. . . . It seems that the opinion is fairly launched into public that they should be placed under the control of a more frequent recurrence to the will of their constituents This seems to be requisite to complete the experiment, whether they do more harm or good." (*Jefferson's Works*, IV, 107.)

Whether anger did not make him see more than there was, and whether the Senate had in this case acted unwisely, need not here be examined. That many of the exceptions taken to its course in later years were not without foundation, will not be denied. In spite of that, however, three generations have been practically unanimous in thinking that, taking all in all, Judge Story was right when he wrote:

> "It has not only been demonstrated (by experience) that the Senate, in its actual organisation, is well adapted to the exigencies of the nation, but that it is a most important and valuable part of the system, and the real balance-wheel which adjusts and regulates its movements." (*Commentaries*, § 702.)

Unless three generations have been egregiously incompetent to form an intelligent opinion of their own interests, it has, therefore, been irrefutably proved that, upon the whole, the *institution* was well devised. In other words: the evils we complain of cannot be justly chargeable to the *institution*, and, consequently, they cannot be cured by abolishing the *institution*. There is no more sense in holding the fathers of the Constitution responsible for it that the Senate has of late been deteriorating to an alarming degree, than there is in bringing a suit against a physician for the sickness brought about by

combining the treatment prescribed by him with the deleterious potions of half a dozen ignorant and unscrupulous quacks. The decline of the Senate is undoubtedly the cause of most serious evils, but this decline is itself a symptom and the result of causes lying outside of and deeper than the Constitution.

"No amount of wisdom in a Constitution," says Justice Miller, "can produce wise government, unless there is a suitable response in the spirit of the people." (*Lectures on the Constitution*, p. 32.) And Story writes: "Private and public virtue is the foundation of republics; and it is folly, if it is not madness, to expect that rulers will not buy what the people are eager to sell. The people may guard themselves against the oppressions of their governors; but who shall guard them against their own oppression of themselves." (*Commentaries*, § 719.)

Let these wise and profound truisms be pondered well by those who think they can lift the Senate again to its former intellectual and moral level by transferring the election of senators from the Legislatures to the people. I do not mean to express myself adversely to this change. But while I admit that it may tend to mend matters somewhat, I am very sure that it cannot effect a real cure of the evil. The advocates of this change are not liable to a grave charge that has to be brought against the radicals, whose virtuous indignation over the shortcomings of the Senate pushes them to the extreme of preaching, that there is no cure,—that the people will have to bear the evil and grin, if they either cannot or will not consign the Senate to the things of the past. The latter are betrayed by their ill-advised patriotic ardor into spending the strength, which might and ought to be devoted to breaking the ground for genuine reforms, in attempts to switch off public opinion on to a track leading straight on to disaster. The former are exerting themselves in behalf of what may unquestionably turn out to be a reform. Still there is at least great danger that they too will mislead public opinion by—wittingly or unwittingly—making it believe that what can at best be a reform, will be a cure. If they do that, they will have wrought more harm than good, for what is needed first and above

all is the opening of the eyes of the people to the true nature and the real causes of the evil.

To contend in the face of the Senate's record for three generations that the election of senators by the State Legislatures had necessarily to prove a failure, is manifestly absurd. If the Legislatures have of late so frequently failed to elect men of the proper stamp that the general character of the Senate has thereby been seriously lowered, the Legislatures must evidently have deteriorated. That a spreading and progressing deterioration of the State Legislatures must affect the nation's life as injuriously as the deterioration of the federal Senate, is, however, self-evident, though Judge Story is unquestionably right in saying: "There is probably no legislative body on earth whose duties are more various and interesting and important to the public welfare, and none which calls for higher talents and more comprehensive attainments and more untiring industry and integrity." (*Commentaries*, § 707.) And as the people can elect to the State Legislatures whomsoever they see fit, it is as incontestable that the people are at fault, if there be a spreading and progressing deterioration of the State Legislatures. Therefore to scold the Senate for being, intellectually and morally, so much below its task, and the State Legislatures for not electing the proper sort of men, is but to denounce the symptoms of the disease. No disease has ever been cured by doing that, and this must be aggravated by it, for it averts the people's attention from the true causes and unless these are fought unremittingly and energetically, they *must* go on gaining steadily and rapidly in potency. It is not only impossible to stamp out the disease, but it must eat its way ever deeper into the very vitals of the republic, so long as the people are lacking either the discernment or the moral courage to lay the blame where it really belongs—at their own door.

To say that the responsibility ultimately rests with the people is, however, to say also that in the nature of things there can be no specific remedy. Specific measures cannot only be helpful, but they are absolutely indispensable. In politics the faith-cure system never works. Though private and public virtue is undoubtedly the foundation of republics, the mere preaching of the necessity of private

and public virtue is not only unavailing, but very apt to work as a benumbing opiate. Definite measures are needed to bar the way to evil tendencies and noxious influences, to stimulate the activity of the vital energies, and to fight the symptoms, which become themselves causes of derangement if they be left unchecked. But if the disease is of long standing and complicated, and if it has affected the whole system, only the veriest quack can believe for a moment that all that is required is to apply some nostrum. Nothing but the removal of all the causes will do and that requires time, patient and persistent work, much deliberation and even experimenting, and a great deal of moral courage and self-abnegation. To keep a great democratic republic hale and sound or to restore it to health if it be diseased, is not so simple and easy as many people—to judge from their talking and still more from their acting—seem to think. It cannot be done either by shouting "hip, hip, hurrah!" or by looking contemptuously and pityingly at "effete monarchies" and praying: "We thank Thee, God, that we are not like these publicans." It is the most arduous task any nation can be put to and it must grow every day more arduous and more difficult, if the problem is not satisfactorily solved every day. In a democratic republic less than under any other form of government is there such a thing as a standstill; onward and upward, or backward and downward—there is no other possibility. The fathers of the country and the authors of the Constitution have bequeathed us not only a splendid heritage, but also an awful trust and a fearful responsibility. Let us beware lest we shall stand branded, as they stand exalted in the annals of mankind.

Let us not turn pessimists—we have no reason to. But let us not be optimists either, wafting on in a self-complacent *dolce far niente*; they are an even more harmful set than the lugubrious croakers. Let us be, what we ought to be—true patriots, looking the facts square in the face in order to do—each of us—our fair share in honestly, vigorously, and hopefully fighting the deeper causes, of which the eclipse of the Senate is but one effect—the evils, with which it stands not only in close, but in organic and genetic connexion.

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ON THE PRINCIPLE OF THE CONSERVATION OF ENERGY.[1]

IN a popular lecture, distinguished for its charming simplicity and clearness, which Joule delivered in the year 1847,[2] that famous physicist declares that the living force which a heavy body has acquired by its descent through a certain height and which it carries with it in the form of the velocity with which it is impressed, is the *equivalent* of the attraction of gravity through the space fallen through, and that it would be "absurd" to assume that this living force could be destroyed without some restitution of that equivalent. He then adds: "You will therefore be surprised to hear that until very *recently* the universal opinion has been that living force could be absolutely and irrevocably destroyed at any one's option." Let us add that to-day, after forty-seven years, the *law of the conservation of energy*, wherever civilisation reaches, is accepted as a fully established truth and receives the widest applications in all domains of natural science.

The fate of all momentous discoveries is similar. On their first appearance they are regarded by the majority of men as errors. J. R. Mayer's work on the principle of energy (1842) was rejected by the first physical journal of Germany; Helmholtz's treatise (1847) met with no better success; and even Joule, to judge from an intimation of Playfair, seems to have encountered difficulties with his

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[1] Translated from Professor Mach's manuscript by Thomas J. McCormack.

[2] *On Matter, Living Force, and Heat*, Joule: *Scientific Papers*, London, 1884 I, p. 265.

first publication (1843). Gradually, however, people are led to see that the new view was long prepared for and ready for enunciation, only that a few favored minds had perceived it much earlier than the rest, and in this way the opposition of the majority is overcome. With proofs of the fruitfulness of the new view, with its success, confidence in it increases. The majority of the men who employ it cannot enter into a deep-going analysis of it; for them, its success is its proof. It can thus happen that a view which has led to the greatest discoveries, like Black's theory of caloric, in a subsequent period in a province where it does not apply may actually become an obstacle to progress by its blinding our eyes to facts which do not fit in with our favorite conceptions. If a theory is to be protected from this dubious rôle, the grounds and motives of its evolution and existence must be examined from time to time with the greatest care.

The most multifarious physical changes, thermal, electrical, chemical, and so forth, may be brought about by mechanical work. When such alterations are reversed they yield anew the mechanical work in exactly the quantity which was required for the production of the part reversed. This is the *principle of the conservation of energy*; "energy" being the term which has gradually come into use for that "indestructible something" of which the measure is mechanical *work*.

How did we acquire this idea? What are the sources from which we have drawn it? This question is not only of interest in itself, but also for the important reason above touched upon. The opinions which are held concerning the foundations of the law of energy still diverge very widely from one another. Many trace the principle to the impossibility of a perpetual motion, which they regard either as sufficiently proved by experience, or as self-evident. In the province of pure mechanics the impossibility of a perpetual motion, or the continuous production of *work* without some *permanent* alteration, is easily demonstrated. Accordingly, if we start from the theory that all physical processes are purely *mechanical* processes, motions of molecules and atoms, we embrace also, by this *mechanical* conception of physics, the impossibility of a perpetual motion in the

whole physical domain. At present this view probably counts the most adherents. Other inquirers, however, are for accepting only a purely *experimental* establishment of the law of energy.

It will appear, from the discussion to follow, that *all* the factors mentioned have co-operated in the development of the view in question; but that in addition to them a logical and purely formal factor, hitherto little considered, has also played a very important part.

I. THE PRINCIPLE OF THE EXCLUDED PERPETUAL MOTION.

The law of energy in its modern form is not identical with the principle of the excluded perpetual motion, but it is very closely related to it. The latter principle, however, is by no means new, for in the province of mechanics it has controlled for centuries the thoughts and investigations of the greatest thinkers. Let us convince ourselves of this by the study of a few historical examples.

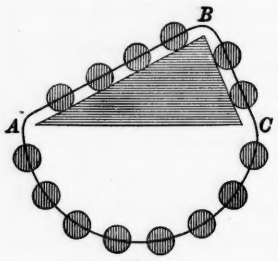

Fig. 1.

S. Stevinus, in his famous work *Hypomnemata mathematica*, Tom. IV, *De statica*, (Leyden, 1605, p. 34), treats of the equilibrium of bodies on inclined planes.

Over a triangular prism *A B C*, one side of which, *A B*, is horizontal, an endless cord or chain is slung, to which at equal distances apart fourteen balls of equal weight are attached, as represented in cross-section in Figure 1. Since we can imagine the lower symmetrical part of the cord *A B C* taken away, Stevinus concludes that the four balls on *A B* hold in equilibrium the two balls on *B C*. For if the equilibrium were for a moment disturbed, it could never subsist: the cord would keep moving round forever in the same direction,—we should have a perpetual motion. He says:

"But if this took place, our row or ring of balls would come once more into their original position, and from the same cause the eight globes to the left would again be heavier than the six to the right, and therefore those eight would sink a second time

and these six rise, and all the globes would keep up, of themselves, *a continuous and unending motion, which is false.*"[1]

Stevinus, now, easily derives from this principle the laws governing equilibrium on the inclined plane and numerous other fruitful consequences.

In the chapter "Hydrostatics" of the same work, page 114, Stevinus sets up the following principle: "Aquam datam, datum sibi intra aquam locum servare,"—a given mass of water preserves within water its given place. This principle is demonstrated as follows (see Fig. 2):

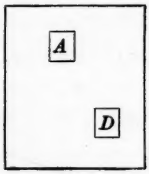

Fig. 2.

"For, assuming it to be possible by natural means, let us suppose that *A* does not preserve the place assigned to it, but sinks down to *D*. This being posited, the water which succeeds *A* will, for the same reason, also flow down to *D*; *A* will be forced out of its place in *D*; and thus this body of water, for the conditions in it are everywhere the same, *will set up a perpetual motion, which is absurd.*"[2]

From this all the principles of hydrostatics are deduced. On this occasion Stevinus also first develops the thought so fruitful for modern analytical mechanics that the equilibrium of a system is not destroyed by the addition of rigid connexions. As we know, the principle of the conservation of the centre of gravity is now sometimes deduced from D'Alembert's principle with the help of that remark. If we were to reproduce Stevinus's demonstration to-day, we should have to change it slightly. We find no difficulty in imagining the cord on the prism possessed of unending uniform motion if all hindrances are thought away, but we should protest against the assumption of an accelerated motion or even against that of a uniform motion, if the resistances were not removed. Moreover, for greater precision of proof, the string of balls might be replaced

[1] "Atqui hoc si sit, globorum series sive corona eundem situm cum priore habebit, eademque de causa octo globi sinistri ponderosiores erunt sex dextris, ideoque rursus octo illi descendent, sex illi ascendent, istique globi ex sese *continuum et aeternum motum efficient, quod est falsum.*"

[2] "*A* igitur, (si ullo modo per naturam fieri possit) locum sibi tributum non servato, ac delabatur in *D*; quibus positis aqua quae ipsi *A* succedi teandem ob causam deffluet in *D*, eademque ab alia istinc expelletur, atque adeo aqua haec (cum ubique eadem ratio sit) *motum instituet perpetuum, quod absurdum fuerit.*"

by a heavy homogeneous cord of infinite flexibility. But all this does not affect in the least the historical value of Stevinus's thoughts. It is a fact, Stevinus deduces apparently much simpler truths from the principle of an impossible perpetual motion.

In the process of thought which conducted Galileo to his discoveries at the end of the sixteenth century, the following principle plays an important part, that a body in virtue of the velocity acquired in its descent can rise exactly as high as it fell. This principle, which appears frequently and with much clearness in Galileo's thought, is simply another form of the principle of excluded perpetual motion, as we shall see it is also in Huygens.

Galileo, as we know, arrived at the law of uniformly accelerated motion by *a priori* considerations, as that law which was the "simplest and most natural," after having first assumed a different law which he was compelled to reject. To verify his law he executed experiments with falling bodies on inclined planes, measuring the times of descent by the weights of the water which flowed out of a small orifice in a large vessel. In this experiment he assumes as a fundamental principle, that the velocity acquired in descent down an inclined plane always corresponds to the vertical height descended through, a conclusion which for him is the immediate outcome of the fact that a body which has fallen down one inclined plane can, with the velocity it has acquired, rise on another plane of any inclination only to the same vertical height. This principle of the height of ascent also led him, as it seems, to the law of inertia. Let us hear his own masterful words in the *Dialogo terzo* (*Opere* Padova, 1744, Tom. III). On page 96 we read:

"I take it for granted that the velocities acquired by a body in descent down planes of different inclinations are equal if the heights of those planes are equal."[1]

Then he makes Salviati say in the dialogue:[2]

"What you say seems very probable, but I wish to go further and by an experiment so to increase the probability of it that it shall amount almost to absolute demon-

[1] "Accipio, gradus velocitatis ejusdem mobilis super diversas planorum inclinationes acquisitos tunc esse aequales, cum eorundem planorum elevationes aequales sint."

[2] "Voi molto probabilmente discorrete, ma oltre al veri simile voglio con una

stration. Suppose this sheet of paper to be a vertical wall, and from a nail driven in it a ball of lead weighing two or three ounces to hang by a very fine thread AB four or five feet long. (Fig. 3.) On the wall mark a horizontal line DC perpendicular to the vertical AB, which latter ought to hang about two inches from the wall. If now the thread AB with the ball attached take the position AC and the ball be let go, you will see the ball first descend through the arc CBD and passing beyond B rise through the arc BD almost to the level of the line CD, being prevented from reaching it exactly by the resistance of the air and of the thread. From this we may truly conclude that its impetus at the point B, acquired by

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esperienza crescer tanto la probabilità, che poco gli manchi all'agguagliarsi ad una ben necessaria dimostrazione. Figuratevi questo foglio essere una parete eretta al orizzonte, e da un chiodo fitto in essa pendere una palla di piombo d'un'oncia, o due, sospesa dal sottil filo $A\,B$ lungo due, o tre braccia perpendicolare all' orrizonte, e nella parete segnate una linea orrizontale $D\,C$ segante a squadra il perpendicolo $A\,B$, il quale sia lontano dalla parete due dita in circa, trasferendo poi il filo $A\,B$ colla palla in $A\,C$, lasciata essa palla in libertà, la quale primier amente vedrete scendere descrivendo l'arco $C\,B\,D$, e di tanto trapassare il termine B, che scorrendo per l'arco $B\,D$ sormonterà fino quasi alla segnata parallela $C\,D$, restando di per vernirvi per piccolissimo intervallo, toltogli il precisamente arrivarvi dall' impedimento dell'aria, e del filo. Dal che possiamo veracemente concludere, che l'impeto acquistato nel punto B dalla palla nello scendere per l'arco $C\,B$, fu tanto, che bastò a risospingersi per un simile arco $B\,D$ alla medesima altezza ; fatta, e più volte reiterata cotale esperienza, voglio, che fiechiamo nella parete rasente al perpendicolo $A\,B$ un chiodo come in E, ovvero in F, che sporga in fuori cinque, o sei dita, e questo acciocchè il filo $A\,C$ tornando come prima a riportar la palla C per l'arco $C\,B$, giunta che ella sia in B, inoppando il filo nel chiodo E, sia costretta a camminare per la circonferenza $B\,G$ descritta in torno al centro E, dal che vedremo quello, che potrà far quel medesimo impeto, che dianzi concepizo nel medesimo termine B, sospinse l'istesso mobile per l'arco $E\,D$ all'altezza dell'orizzonale $C\,D$. Ora, Signori, voi vedrete con gusto condursi la palla all'orizzontale nel punto G, e l'istesso accadere, l'intoppo si metesse più basso, come in F, dove la palla descriverebbe l'arco $B\,J$, terminando sempre la sua salita precisamente nella linea $C\,D$, e quando l'intoppe del chiodo fusse tanto basso, che l'avanzo del filo sotto di lui non arivasse all' altezza di $C\,D$ (il che accaderebbe, quando fusse più vicino al punto B, che al segamento dell' $A\,B$ coll'orizzontale $C\,D$), allora il filo cavalcherebbe il chiodo, e segli avolgerebbe intorno. Questa esperienza non lascia luogo di dubitare della verità del supposto : imperocchè essendo li due archi $C\,B$, $D\,B$ equali e similmento posti, l'acquisto di momento fatto per la scesa nell'arco $C\,B$, è il medesimo, che il fatto per la scesa dell'arco $D\,B$; ma il momento acquistato in B per l'arco $C\,B$ è potente a risospingere in su il medesimo mobile per l'arco $B\,D$; adunque anco il momento acquistato nella scesa $D\,B$ è eguale a quello, che sospigne l'istesso mobile pel medesimo arco da B in D, sicche universalmente ogni momento acquistato per la scesa dun arco è eguale a quello, che può far risalire l'istesso mobile pel medesimo arco : ma i momenti tutti che fanno risalire per tutti gli archi $B\,D$, $B\,G$, $B\,J$ sono eguali, poichè son fatti dal istesso medesimo momento acquistato per la scesa $C\,B$, come mostra l'esperienza : adunque tutti i momenti, che si acquistano per le scese negli archi $D\,B$, $G\,B$. $J\,B$ sono eguali."

its descent through the arc *CB*, is sufficient to urge it through a similar arc *BD* to the same height. Having performed this experiment and repeated it several times, let us drive in the wall, in the projection of the vertical *AB*, as at *E* or at *F*, a nail five or six inches long, so that the thread *AC*, carrying as before the ball through the arc *CB*, at the moment it reaches the position *AB*, shall strike the nail *E*, and the ball be thus compelled to move up the arc *BG* described about *E* as centre. Then we shall see what the same impetus will here accomplish, acquired now as before at the same point *B*, which then drove the same moving body through the arc *BD* to the height of the horizontal *CD*. Now gentlemen, you will be pleased to see the ball rise to the horizontal line at the point *G*, and the same thing also happen if the nail be placed lower as at *F*, in which case the ball would describe the arc *BJ*, always terminating its ascent precisely at the line *CD*. If the nail be placed so low that the length of thread below it does not reach the height of *CD* (which would happen if *F* were nearer *B* than to the intersection of *AB* with the horizontal *CD*), then the thread will wind itself about the nail. This experiment leaves no room for doubt as to the truth of the supposition. For as the two arcs *CB*, *DB* are equal and similarly situated, the momentum acquired in the descent of the arc *CB* is the same as that acquired in the descent of the arc *DB*; but the momentum acquired at *B* by the descent through the arc *CB* is capable of driving up the same moving body through the arc *BD*; hence also the momentum acquired in the descent *DB* is equal to that which drives the same moving body through the same arc from *B* to *D*, so that in general every momentum acquired in the descent of an arc is equal to that which causes the same moving body to ascend through the same arc; but all the momenta which cause the ascent of all the arcs *BD*, *BG*, *BJ*, are equal since they are made by the same momentum acquired in the descent *CB*, as the experiment shows: therefore all the momenta acquired in the descent of the arcs *DB*, *GB*, *JB* are equal."

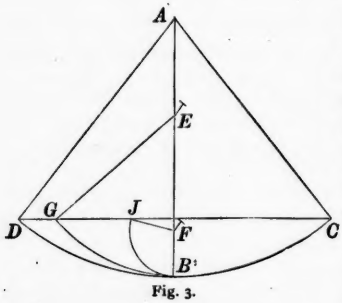

Fig. 3.

The remark relative to the pendulum may be applied to the inclined plane and leads to the law of inertia. We read on page 124:[1]

"It is plain now that a movable body, starting from rest at *A* and descending down the inclined plane *AB*, acquires a velocity proportional to the increment of

[1] "Constat jam, quod mobile ex quiete in *A* descendens per *AB*, gradus acquirit velocitatis juxta temporis ipsius incrementum: gradum vero in *B* esse maximum acquisitorum, et suapte natura immutabiliter impressum, sublatis scilicet causis

its time: the velocity possessed at B is the greatest of the velocities acquired, and by its nature immutably impressed, provided all causes of new acceleration or retardation are taken away: I say acceleration, having in view its possible further progress along the plane extended; retardation, in view of the possibility of its being reversed and made to mount the ascending plane BC. But in the horizontal plane GH its equable motion, according to its velocity as acquired in the descent from A to B, will be continued *ad infinitum*."

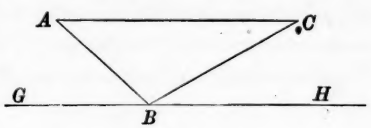

Fig. 4.

Huygens, in every respect the lineal successor of Galileo, forms a sharper conception of the law of inertia and generalises the principle respecting the heights of ascent which was so fruitful in Galileo's hands. He employs the latter principle in the solution of the problem of the centre of oscillation and is perfectly clear in the statement that the principle respecting the heights of ascent is identical with the principle of the excluded perpetual motion.

The following important passages then occur, (Hugenii, *Horologium oscillatorium, pars secunda*). *Hypotheses*:

"If gravity did not exist, nor the atmosphere obstruct the motions of bodies, a body would keep up forever the motion once impressed upon it, with equable velocity, in a straight line."[1]

In part fourth of the *Horologium de centro oscillationis* we read:

"If any number of weights be set in motion by the force of their gravity, the common centre of gravity of the weights as a whole cannot possibly rise higher than the place which it occupied when the motion began.

"That this hypothesis of ours may arouse no scruples, we will state that it simply imports, what no one has ever denied, that heavy bodies do not move *upwards*.—And truly if the devisers of the new machines who make such futile attempts to construct a perpetual motion would acquaint themselves with this princi-

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accelerationis novae, aut retardationis: accelerationis inquam, si adhuc super extenso plano ulterius progrederetur; retardationis vero, dum super planum acclive BC fit reflexio: in horizontali autem GH aequabilis motus juxta gradum velocitatis ex A in B acquisitae in infinitum extenderetur.

[1] "Si gravitas non esset, neque aër motui corporum officeret, unumquodque eorum, acceptum semel motum continuaturum velocitate aequabili, secundum lineam rectam."

ple, they could easily be brought to see their errors and to understand that the thing is utterly impossible by mechanical means."[1]

There is possibly a Jesuitical mental reservation contained in the words "mechanical means." One might be led to believe from them that Huygens held a non-mechanical perpetual motion for possible.

The generalisation of Galileo's principle is still more clearly put in Proposition IV of the same chapter:

"If a pendulum, composed of several weights, set in motion from rest, complete any part of its full oscillation, and from that point onwards, the individual weights, with their common connexions dissolved, change their acquired velocities upwards and ascend as far as they can, the common centre of gravity of all will be carried up to the same altitude that it occupied before the beginning of the oscillation."[2]

On this last principle now, which is a generalisation, applied to a system of masses, of one of Galileo's ideas respecting a single mass and which from Huygens's explanation we recognise as the principle of excluded perpetual motion, Huygens grounds his theory of the centre of oscillation. Lagrange characterises this principle as precarious and is rejoiced at James Bernoulli's successful attempt, in 1681, to reduce the theory of the centre of oscillation to the laws of the lever, which appeared to him clearer. All the great inquirers of the seventeenth and eighteenth centuries broke a lance on this problem and it led ultimately, in conjunction with the principle of virtual velocities, to the principle enunciated by D'Alembert in 1743

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[1] "Si pondera quotlibet, vi gravitatis suae, moveri incipiant; non posse centrum gravitatis ex ipsis compositae altius, quam ubi incipiente motu reperiebatur, ascendere.

"Ipsa vero hypothesis nostra quominus scrupulum moveat, nihil aliud sibi velle ostendemus, quam, quod nemo unquam negavit, gravia nempe sursum non ferri.—Et sane, si hac eadem uti scirent novorum operum machinatores, qui motum perpetuum irrito conatu moliuntur, facile suos ipsi errores deprehenderent, intelligerentque rem eam mechanica ratione haud quaquam possibilem esse."

[2] "Si pendulum e pluribus ponderibus compositum, atque e quiete dimissum, partem quamcunque oscillationis integrae confecerit, atque inde porro intelligantur pondera ejus singula, relicto communi vinculo, celeritates acquisitas sursum convertere, ac quousque possunt ascendere; hoc facto centrum gravitatis ex omnibus compositae, ad eandem altitudinem reversum erit, quam ante inceptam oscillationem obtinebat."

in his *Traité de dynamique*, though previously employed in a somewhat different form by Euler and Hermann.

Besides this, the Huygenian principle respecting the heights of ascent became the foundation of the "law of the conservation of living force," as it was enunciated by John and Daniel Bernoulli and employed with such signal success by the latter in his *Hydrodynamics*. The theorems of the Bernoullis differ only in form from Lagrange's expression in the *Analytical Mechanics*.

The manner in which Torricelli reached his famous law of efflux for liquids leads again to our principle. Torricelli assumed that the liquid which flows out of the basal orifice of a vessel cannot by its velocity of efflux ascend to a greater height than its level in the vessel.

Let us next consider a point which belongs to pure mechanics, the history of the principle of *virtual motions* or *virtual velocities*. This principle was not first enunciated, as is usually stated, and as Lagrange also asserts, by Galileo, but earlier, by Stevinus. In his *Trochleostatica* of the above-cited work, page 72, he says:

"Observe that this axiom of statics holds good here:

"As the space of the body acting is to the space of the body acted upon, so is the power of the body acted upon to the power of the body acting."[1]

Galileo, as we know, recognised the truth of the principle in the consideration of the simple machines, and also deduced the laws of the equilibrium of liquids from it.

Torricelli carries the principle back to the properties of the centre of gravity. The condition controlling equilibrium in a simple machine, in which power and load are represented by weights, is that the common centre of gravity of the weights shall not sink. Conversely, if the centre of gravity cannot sink equilibrium obtains, because heavy bodies of themselves do not move upwards. In this form the principle of virtual velocities is identical with Huygens's principle of the impossibility of a perpetual motion.

John Bernoulli, in 1717, first perceived the general significance

[1] "Notato autem hic illud staticum axioma etiam locum habere:
"Ut spatium agentis ad spatium patientis
Sic potentia patientis ad potentiam agentis."

of the principle of virtual movements for all systems; a discovery stated in a letter to Varignon. Finally, Lagrange gives a general demonstration of the principle and founds upon it his whole *Analytical Mechanics*. But this general demonstration is based after all upon Huygens and Torricelli's remarks. Lagrange, as is known, conceives simple pulleys arranged in the directions of the forces of the system, passes a cord through these pulleys, and appends to its free extremity a weight which is a common measure of all the forces of the system. With no difficulty, now, the number of elements of each pulley may be so chosen that the forces in question shall be replaced by them. It is then clear that if the weight at the extremity cannot sink, equilibrium subsists, because heavy bodies cannot of themselves move upwards. If we do not go so far, but wish to abide by Torricelli's idea, we may conceive every individual force of the system replaced by a special weight suspended from a cord passing over a pulley in the direction of the force and attached at its point of application. Equilibrium subsists then when the common centre of gravity of all the weights together cannot sink. The fundamental supposition of this demonstration is plainly the impossibility of a perpetual motion.

Lagrange tried in every way to supply a proof free from extraneous elements and fully satisfactory, but without complete success. Nor were his successors more fortunate.

The whole of mechanics, thus, is based upon an idea which, though unequivocal, is yet unwonted and not coequal with the other principles and axioms of mechanics. Every student of mechanics, at some stage of his progress, feels the uncomfortableness of this state of affairs; every one wishes it removed; but seldom is the difficulty stated in words. Accordingly, the zealous pupil of the science is highly rejoiced when he reads in a master like Poinsot (*Théorie générale de l'équilibre et du mouvement des systèmes*) the following passage, in which that author is giving his opinion of the *Analytical Mechanics*:

"In the meantime, because our attention in that work was first wholly engrossed with the consideration of its beautiful development of mechanics, which seemed to spring complete from a single formula, we naturally believed that the science was

completed or that it only remained to seek the demonstration of the principle of virtual velocities. But that quest brought back all the difficulties that we had overcome by the principle itself. That law so general, wherein are mingled the vague and unfamiliar ideas of infinitely small movements and of perturbations of equilibrium, only grew obscure upon examination; and the work of Lagrange supplying nothing clearer than the march of analysis, we saw plainly that the clouds had only appeared lifted from the course of mechanics because they had, so to speak, been gathered at the very origin of that science.

"At bottom, a general demonstration of the principle of virtual velocities would be equivalent to the establishment of the whole of mechanics upon a different basis: for the demonstration of a law which embraces a whole science is neither more nor less than the reduction of that science to another law just as general, but evident, or at least more simple than the first, and which, consequently, would render that useless."[1]

According to Poinsot, therefore, a proof of the principle of virtual movements is tantamount to a total rehabilitation of mechanics.

Another circumstance of discomfort to the mathematician is, that in the historical form in which mechanics at present exists, dynamics is founded on statics, whereas it is desirable that in a science which pretends to deductive completeness the more special statical theorems should be deducible from the more general dynamical principles.

In fact, a great master, Gauss, gave expression to this desire in his presentment of the principle of least constraint (Crelle's *Journal für reine und angewandte Mathematik*, Vol. IV, p. 233) in the follow-

[1] "Cependant, comme dans cet ouvrage on ne fut d'abord attentif qu'à considérer ce beau développement de la mécanique qui semblait sortir tout entière d'une seule et même formule, on crut naturellement que la science etait faite, et qu'il ne restait plus qu'à chercher la démonstration du principe des vitesses virtuelles. Mais cette recherche ramena toutes les difficultés qu'on avait franchies par le principe même. Cette loi si générale, où se mêlent des idées vagues et étrangères de mouvements infinement petits et de perturbation d'équilibre, ne fit en quelque sorte que s'obsurcir à l'examen; et le livre de Lagrange n'offrant plus alors rien de clair que la marche des calculs, on vit bien que les nuages n'avaient paru levé sur le cours de la mécanique que parcequ'ils étaient, pour ainsi dire, rassemblés à l'origine même de cette science.

"Une démonstration générale du principe des vitesses virtuelles devait au fond revenir a établir le mécanique entière sur une autre base: car la demonstration d'une loi qui embrasse toute une science ne peut être autre chose que la reduction de cette science à une autre loi aussi générale, mais évidente, ou du moins plus simple que la première, et qui partant la rende inutile."

ing words: "Proper as it is that in the gradual development of a science, and in the instruction of individuals, the easy should precede the difficult, the simple the complex, the special the general, yet the mind, when once it has reached a higher point of view, demands the contrary course, in which all statics shall appear simply as a special case of mechanics." Gauss's own principle, now, possesses all the requisites of universality, but its difficulty is that it is not immediately intelligible and that Gauss deduced it with the help of D'Alembert's principle, a procedure which left matters where they were before.

Whence, now, is derived this strange part which the principle of virtual motion plays in mechanics? For the present I shall only make this reply. It would be difficult for me to tell the difference of impression which Lagrange's proof of the principle made on me when I first took it up as a student and when I subsequently resumed it after having made historical researches. It first appeared to me insipid, chiefly on account of the pulleys and the cords which did not fit in with the mathematical view, and whose action I would much rather have discovered from the principle itself than have taken for granted. But now that I have studied the history of the science I cannot imagine a more beautiful demonstration.

In fact, through all mechanics it is this self-same principle of excluded perpetual motion which accomplishes almost all, which displeased Lagrange, but which he had yet to employ, at least tacitly, in his own demonstration. If we give this principle its proper place and setting, the paradox is explained.

The principle of excluded perpetual motion is thus no new discovery; it has been the guiding idea, for three hundred years, of all the great inquirers. But the principle cannot properly be *based* upon mechanical perceptions. For long before the development of mechanics the conviction of its truth existed and even contributed to that development. Its power of conviction, therefore, must have more universal and deeper roots. We shall revert to this point.

II. MECHANICAL PHYSICS.

It cannot be denied, that an unmistakable tendency has prevailed, from Democritus to the present day, to explain *all* physical events *mechanically*. Not to mention earlier obscure expressions of that tendency we read in Huygens the following :[1]

"There can be no doubt that light consists of the *motion* of a certain substance. For if we examine its production, we find that here on earth it is principally fire and flame which engender it, both of which contain beyond doubt bodies which are in rapid movement, since they dissolve and destroy many other bodies more solid than they : while if we regard its effects, we see that when light is accumulated, say by concave mirrors, it has the property of combustion just as fire has, that is to say, it disunites the parts of bodies, which is assuredly a proof of *motion*, at least in the *true philosophy*, in which the causes of all natural effects are conceived as *mechanical* causes. Which in my judgment must be accomplished or all hope of ever understanding physics renounced."[2]

S. Carnot,[3] in introducing the principle of excluded perpetual motion into the theory of heat, makes the following apology :

"It will be objected here, perhaps, that a perpetual motion proved impossible for *purely mechanical actions*, is perhaps not so when the influence of *heat* or of electricity is employed. But can phenomena of heat or electricity be thought of as due to anything else than to *certain motions of bodies*, and as such must they not be subject to the general laws of mechanics ?"[4]

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[1] *Traité de la lumière*, Leyden, 1690, p. 2.

[2] L'on ne sçaurait douter que la lumière ne consiste dans le *mouvement* de certaine matière. Car soit qu'on regarde sa production, on trouve qu'içy sur la terre c'est principalement le feu et la flamme qui l'engendrent, lesquels contient sans doute des corps qui sont dans un mouvement rapide, puis qu'ils dissolvent et fondent plusieurs autres corps des plus solides : soit qu'on regarde ses effets, on voit que quand la lumière est ramasseé, comme par des miroires concaves, elle a la vertu de brûler comme le feu, c-est-à-dire qu'elle desunit les parties des corps; ce qui marque assurément du *mouvement*, au moins dans la *vraye Philosophie*, dans laquelle on conçoit la cause de tous les effets naturels par des raisons de *mechanique*. Ce qu'il faut faire à mon avis, ou bien renoncer à toute espérance de jamais rien comprendre dans la Physique."

[3] *Sur la puissance motrice du feu.* (Paris, 1824.)

[4] "On objectra peut-être ici que le mouvement perpétuel, démontré impossible par les *seules actions mécaniques*, ne l'est peut-être pas lorsqu'on emploie l'influence soit de la *chaleur*, soit de l'électricité ; mais peut-on concevoir les phénomènes de

These examples, which might be multiplied by quotations from recent literature indefinitely, show that a tendency to explain all things mechanically actually exists. This tendency is also intelligible. Mechanical events as simple motions in space and time best admit of observation and pursuit by the help of our highly organised senses. We reproduce mechanical processes almost without effort in our imagination. Pressure as a circumstance that produces motion is very familiar to us from daily experience. All changes which the individual personally produces in his environment or humanity brings about by means of the arts in the world, are effected through the instrumentality of *motions*. Almost of necessity, therefore, motion appears to us as the most important physical factor. Moreover, mechanical properties may be discovered in all physical events. The sounding bell trembles, the heated body expands, the electrified body attracts other bodies. Why, therefore, should we not attempt to grasp all events under their mechanical aspect, since that is so easily apprehended and most accessible to observation and measurement? In fact, no objection *is* to be made to the attempt to elucidate the properties of physical events by mechanical *analogies*.

But modern physics has proceeded *very far* in this direction. The point of view which Wundt represents in his very interesting treatise *On the Physical Axioms* is probably shared by the majority of physicists. The axioms of physics which Wundt sets up are as follows:

1. All natural causes are motional causes.
2. Every motional cause lies outside the object moved.
3. All motional causes act in the direction of the straight line of junction, and so forth.
4. The effect of every cause persists.
5. Every effect involves an equal countereffect.
6. Every effect is equivalent to its cause.

These principles might be studied properly enough as fundamental principles of mechanics. But when they are set up as axioms

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la chaleur et de l'électricité comme dus à autre chose qu'à des *mouvements quelconques des corps* et comme tels ne doivent-ils pas être soumis aux lois générales de la mécanique?"

of physics, their enunciation is simply tantamount to a negation of all events except motion.

According to Wundt, all changes of nature are mere changes of place. All causes are motional causes (page 26). Any discussion of the philosophical grounds on which Wundt supports his theory would lead us deep into the speculations of the Eleatics and the Herbartians. Change of place, Wundt holds, is the *only* change of a thing in which a thing remains identical with itself. If a thing changed *qualitatively*, we should be obliged to imagine that something was annihilated and something else created in its place, which is not to be reconciled with our idea of the identity of the object observed and of the indestructibility of matter. But we have only to remember that the Eleatics encountered difficulties of exactly the same sort in motion. Can we not also imagine that a thing is destroyed in *one* place and in *another* an exactly similar thing created? After all, do we really know *more* why a body leaves one place and appears in another, than why a *cold* body grows *warm*? Granted that we had a perfect knowledge of the mechanical processes of nature, could we and should we, for that reason, *put out of the world* all other processes that we do not understand? On this principle it would be really the simplest course to deny the existence of the whole world. This is the point at which the Eleatics ultimately arrived, and the school of Herbart stopped little short of reaching the same goal.

Physics treated in this sense supplies us simply with a diagram of the world, in which we do not know reality again. It happens, in fact, to men who give themselves up to this view for many years, that the world of sense from which they start as a province of the great familiarity, suddenly becomes, in their eyes, the supreme "world-riddle."

Intelligible as it is, therefore, that the efforts of thinkers have always been bent upon the "reduction of all physical processes to the motions of atoms," it must yet be affirmed that this is a chimerical ideal. This ideal has often played an effective part in popular lectures, but in the workshop of the serious inquirer it has discharged scarcely the least function. What has really been achieved in mechan-

ical physics is either the *elucidation* of physical processes by more familiar *mechanical analogies*, (for example, the theories of light and of electricity,) or the exact *quantitative* ascertainment of the connexion of mechanical processes with other physical processes, for example, the results of thermodynamics.

III. THE PRINCIPLE OF ENERGY IN PHYSICS.

We can know only from *experience* that mechanical processes produce other physical transformations, or *vice versa*. The attention was first directed to the connexion of mechanical processes, especially the performance of work, with changes of thermal conditions by the invention of the steam-engine, and by its great technical importance. Technical interests and the need of scientific lucidity meeting in the mind of S. Carnot led to the remarkable development from which thermodynamics flowed. It is simply *an accident of history* that the development in question was not connected with the practical applications of *electricity*.

In the determination of the maximum quantity of *work* that, in general, a heat-machine, or, to take a special case, a steam-engine, can perform with the expenditure of a *given* amount of heat of combustion, Carnot is guided by mechanical analogies. A body can do work on being heated, by expansion under pressure. But to do this the body must receive heat from a *hotter* body. Heat, therefore, to do work, must pass from a hotter body to a colder body, just as water must fall from a higher level to a lower level to put a mill-wheel in motion. Differences of temperature, accordingly, represent forces able to do work exactly as do differences of height in heavy bodies. Carnot pictures to himself an ideal process in which no heat flows away unused, that is, without doing work. With a given expenditure of heat, accordingly, this process furnishes the maximum of work. An analogue of the process would be a mill-wheel which scooping its water out of a higher level would slowly carry it to a lower level without the loss of a drop. A peculiar property of the process is, that with the expenditure of the same work the water can be raised again exactly to its original level. This property of *reversibility* is also shared by the process of Carnot. His process

also can be reversed by the expenditure of the same amount of work, and the heat again brought back to its original temperature level.

Suppose, now, we had *two* different reversible processes A, B, such that in A a quantity of heat, Q, flowing off from the temperature t_1 to the lower temperature t_2 should perform the work W, but in B under the same circumstances it should perform a greater quantity of work, $W + W'$; then, we could join B in the sense assigned and A in the reverse sense into a *single* process. Here A would reverse the transformation of heat produced by B and would leave a surplus of work W', produced, so to speak, from nothing. The combination would present a perpetual motion.

With the feeling, now, that it makes little difference whether the mechanical laws are broken directly or indirectly (by processes of heat), and convinced of the existence of a *universal* law-ruled connexion of nature, Carnot here excludes for the first time from the province of *general* physics the possibility of a perpetual motion. *But it follows, then, that the quantity of work W, produced by the passage of a quantity of heat Q from a temperature t_1 to a temperature t_2, is independent of the nature of the substances as also of the character of the process, so far as that is unaccompanied by loss, but is wholly dependent upon the temperatures t_1, t_2.*

This important principle has been fully confirmed by the special researches of Carnot himself (1824), of Clapeyron (1834), and of Sir William Thomson (1849), now Lord Kelvin. The principle was reached *without any assumption whatever* concerning the nature of heat, simply by the exclusion of a perpetual motion. Carnot, it is true, was an adherent of the theory of Black, according to which the sum-total of the quantity of heat in the world is constant, but so far as his investigations have been hitherto considered the decision on this point is of no consequence. Carnot's principle led to the most remarkable results. W. Thomson (1848) founded upon it the ingenious idea of an "absolute" scale of temperature. James Thomson (1849) conceived a Carnot process to take place with water freezing under pressure and, therefore, performing work. He discovered, thus, that the freezing point is lowered $0{\cdot}0075^\circ$ Celsius by every additional atmosphere of pressure. This is mentioned merely as an example.

About twenty years after the publication of Carnot's book a further advance was made by J. R. Mayer and J. P. Joule. Mayer, while engaged as a physician in the service of the Dutch, observed, during a process of bleeding in Java, an unusual redness of the venous blood. In agreement with Liebig's theory of animal heat he connected this fact with the diminished loss of heat in warmer climates, and with the diminished expenditure of organic combustibles. The total expenditure of heat of a man at rest must be equal to the total heat of combustion. But since *all* organic actions, even the mechanical actions, must be placed to the credit of the heat of combustion, some connexion must exist between mechanical work and expenditure of heat.

Joule started from quite similar convictions concerning the galvanic battery. A heat of association equivalent to the consumption of the zinc can be made to appear in the galvanic cell. If a current is set up, a part of this heat appears in the conductor of the current. The interposition of an apparatus for the decomposition of water causes a part of this heat to disappear, which on the burning of the explosive gas formed, is reproduced. If the current runs an electromotor, a portion of the heat again disappears, which, on the consumption of the work by friction, again makes its appearance. Accordingly, both the heat produced and the work produced, appeared to Joule also as connected with the consumption of material. The thought was therefore present, both to Mayer and to Joule, of regarding heat and work as equivalent quantities, so connected with each other that what is lost in one form universally appears in another. The result of this was a *substantial* conception of heat and of work, and *ultimately a substantial conception of energy.* Here every physical change of condition is regarded as energy, the destruction of which generates work or equivalent heat. An electric charge, for example, is energy.

In 1842 Mayer had calculated from the physical constants then generally recognised that by the disappearance of one kilogrammecalorie 365 kilogrammetres of work could be performed, and *vice versa.* Joule, on the other hand, by a long series of delicate and varied experiments beginning in 1843 ultimately determined the

mechanical equivalent of the kilogramme-calorie, more exactly, as 425 kilogrammetres.

If we estimate every change of physical condition by the *mechanical work* which can be performed upon the *disappearance* of that condition, and call this measure *energy*, then we can measure all physical changes of condition, no matter how different they may be, with the same common measure, and say: *the sum-total of all energy remains constant.* This is the form that the principle of excluded perpetual motion received at the hands of Mayer, Joule, Helmholtz, and W. Thomson in its extension to the whole domain of physics.

After it had been proved that heat must *disappear* if mechanical work was to be done at its expense, Carnot's principle could no longer be regarded as a complete expression of the facts. Its improved form was first given, in 1850, by Clausius, whom Thomson followed in 1851. It runs thus: "If a quantity of heat Q' is transformed into work in a reversible process, *another* quantity of heat Q of the absolute[1] temperature T_1 is lowered to the absolute temperature T_2." Here Q' is dependent only on Q, T_1, T_2, but is independent of the substances used and of the character of the process, so far as that is unaccompanied with loss. Owing to this last fact, it is sufficient to find the relation which obtains for some one well-known physical substance, say a gas, and some definite simple process. The relation found will be the one which holds generally. We get, thus,

$$\frac{Q'}{Q'+Q}=\frac{T_1-T_2}{T_1} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

that is, the quotient of the available heat Q' transformed into work divided by the sum of the transformed and transferred heats (the total sum used), the so-called *economical coefficient* of the process, is,

$$\frac{T_1-T_2}{T_1}.$$

IV. THE CONCEPTIONS OF HEAT.

When a cold body is put in contact with a warm body it is observed that the first body is warmed and that the second body is

[1] By this is meant the temperature of a Celsius scale, the zero of which is 273° below the melting point of ice.

cooled. We may say that the first body is warmed *at the expense of* the second body. This suggests the notion of a thing, or heat-substance, which passes from the one body to the other. If two masses of water m, m', of unequal temperatures, be put together, it will be found, upon the rapid equalisation of the temperatures, that the respective changes of temperatures u and u' are inversely proportional to the masses and of opposite signs, so that the algebraical sum of the products is,

$$m u + m' u' = 0.$$

Black called the products $m u$, $m' u'$, which are decisive for our knowledge of the process, *quantities of heat*. We may form a very clear *picture* of these products by conceiving them with Black as measures of the quantities of some substance. But the essential thing is not this picture but the *constancy* of the sum of these products in simple processes of conduction. If a quantity of heat disappears at one point, an equally large quantity will make its appearance at some other point. The retention of this idea leads to the discovery of specific heat. Black, finally, perceives that also something else may appear for a vanished quantity of heat, namely: the fusion or evaporation of a definite quantity of matter. He adheres here still to his favorite view, though with some freedom, and considers the vanished quantity of heat as still present, but as *latent*.

The generally accepted notion of a caloric, or heat-stuff, was strongly shaken by the work of Mayer and Joule. If the quantity of heat can be increased and diminished, people said, heat cannot be a substance, but must be a *motion*. The subordinate part of this statement has become much more popular than all the rest of the doctrine of energy. But we may convince ourselves that the motional conception of heat is now as unessential as was formerly its conception as a substance. Both ideas were favored or impeded solely by accidental historical circumstances. It does not follow that heat is not a substance from the fact that a mechanical equivalent exists for quantity of heat. We will make this clear by the following question which bright students have sometimes put to me. Is there a mechanical equivalent of electricity as there is a mechanical equivalent of heat? Yes, and no. There is no mechanical equivalent of

quantity of electricity as there is an equivalent of *quantity* of heat, because the same quantity of electricity has a very different capacity for work, according to the circumstances in which it is placed; but there *is* a mechanical equivalent of electrical energy.

Let us ask another question. Is there a mechanical equivalent of water? No, there is no mechanical equivalent of quantity of water, but there is a mechanical equivalent of weight of water multiplied by its distance of descent.

When a Leyden jar is discharged and work thereby performed, we do not picture to ourselves that the quantity of electricity disappears as work is done, but we simply assume that the electricities come into different positions, equal quantities of positive and negative electricity being united with one another.

What, now, is the reason of this difference of view in our treatment of heat and of electricity? The reason is purely historical, wholly conventional, and, what is still more important, is wholly indifferent. I may be allowed to establish this assertion.

In 1785 Coulomb constructed his torsion balance, by which he was enabled to measure the repulsion of electrified bodies. Suppose we have two small balls, A, B, which over their whole extent are similarly electrified. These two balls will exert on one another, at a certain distance r of their centres, a certain repulsion p. We bring into contact with B now a ball C, suffer both to be equally electrified, and then measure the repulsion of B from A and of C from A at the same distance r. The sum of these repulsions is again p. Accordingly something has remained constant. If we ascribe this effect to a substance, then we infer naturally its constancy. But the essential point of the exposition is the divisibility of the electric force p and not the simile of substance.

In 1838 Riess constructed his electrical air-thermometer (thermoelectrometer). This gives a measure of the quantity of heat produced by the discharge of jars. This quantity of heat is not proportional to the quantity of electricity contained in the jar by Coulomb's measure, but if q be this quantity and c be the capacity, is proportional to $q^2/2c$, or, more simply still, to the energy of the charged jar. If, now, we discharge the jar completely through the thermo-

meter, we obtain a certain quantity of heat, *W*. But if we make the discharge through the thermometer into a second jar, we obtain a quantity less than *W*. But we may obtain the remainder by completely discharging both jars through the air-thermometer, when it will be again proportional to the energy of the two jars. On the first, incomplete discharge, accordingly, a part of the electricity's capacity for work was lost.

When the charge of a jar produces heat its energy is changed and its value by Riess's thermometer is decreased. But by Coulomb's measure the quantity remains unaltered.

Now let us imagine that Riess's thermometer was invented before Coulomb's torsion balance, which is not a difficult feat, since both inventions are independent of each other; what would be more natural than that the "quantity" of electricity contained in a jar should be measured by the heat produced in the thermometer? But then, this so-called quantity of electricity would decrease on the production of heat or on the performance of work, whereas it now remains unchanged; in that case, therefore, electricity would not be a *substance* but a *motion*, whereas it is now still a substance. The reason, therefore, why we have other notions of electricity than we have of heat, is purely historical, accidental, and conventional.

This is also the case with other physical things. Water does not disappear when work is done. Why? Because we measure quantity of water with scales, just as we do electricity. But suppose the capacity of the water for work were called quantity, and had to be measured, therefore, by a mill instead of by scales; then this quantity also would disappear as it performed the work. It may, now, be easily conceived that many substances are not so easily got at as water. In that case we should be unable to carry out the one kind of measurement with the scales whilst many other modes of measurement would still be left us.

In the case of heat, now, the historically established measure of "quantity" is accidentally the work-value of the heat. Accordingly, its quantity disappears when work is done. But that heat is not a substance follows from this as little as does the opposite conclusion that it is a substance. In Black's case the quantity of

heat remains constant because the heat passes into no *other* form of energy.

If any one to-day should still wish to think of heat as a substance, we might allow that person this liberty with little ado. He would only have to assume that that which we call quantity of heat was the energy of a substance whose quantity remained unaltered, but whose energy changed. In point of fact we might much better say, in analogy with the other terms of physics, energy of heat, instead of quantity of heat.

When we wonder, therefore, at the discovery that heat is motion, we wonder at something that was never discovered. It is perfectly indifferent and possesses not the slightest scientific value, whether we think of heat as a substance or not. The fact is, heat behaves in some connexions like a substance, in others not. Heat is latent in steam as oxygen is latent in water.

V. THE CONFORMITY IN THE DEPORTMENT OF THE ENERGIES.

The foregoing reflexions will gain in lucidity from a consideration of the conformity which obtains in the behavior of all energies, a point to which I called attention long ago.[1]

A weight P at a height H_1 represents an energy $W_1 = PH_1$. If we suffer the weight to sink to a lower height H_2, during which work is done, and the work done is employed in the production of living force, heat, or an electric charge, in short is transformed, then the energy $W_2 = PH_2$ is still *left*. The equation subsists,

$$\frac{W_1}{H_1} = \frac{W_2}{H_2}, \quad \ldots \ldots \ldots \ldots \ldots \ldots \quad (2)$$

or, denoting the *transformed* energy by $W' = W_1 - W_2$ and the *transferred* energy, that transported to the lower level, by $W = W_2$,

$$\frac{W'}{W' + W} = \frac{H_1 - H_2}{H_1}, \quad \ldots \ldots \ldots \ldots \ldots \quad (3)$$

[1] I first drew attention to this fact in my treatise *Ueber die Erhaltung der Arbeit*, Prague, 1872. Before this, Zeuner had pointed out the analogy between mechanical and thermal energy. I have given a more extensive development of this idea in a communication to the *Sitzungsberichte der Wiener Akademie*, December, 1892, entitled *Geschichte und Kritik des Carnot'schen Wärmegesetzes*. Compare also the works of Popper (1884), Helm (1887), Wronsky (1888), and Ostwald (1892).

an equation in all respects analogous to equation (1) at page 41. The property in question, therefore, is by no means peculiar to heat. Equation (2) gives the relation between the energy taken from the higher level and that deposited on the lower level (the energy left behind); it says that these *energies* are proportional to the *heights of the levels*. An equation analogous to equation (2) may be set up for *every* form of energy; hence the equation which corresponds to equation (3), and so to equation (1), may be regarded as valid for every form. For electricity, for example, H_1, H_2 signify the potentials.

When we observe for the first time the agreement here indicated in the transformative law of the energies, it appears surprising and unexpected, for we do not perceive at once its reason. But to him who pursues the comparative historical method that reason will not long remain a secret.

Since Galileo, mechanical work, though long under a different name, has been a *fundamental concept* of mechanics, as also a very important notion in the applied sciences. The transformation of work into living force, and of living force into work, suggests directly the notion of energy—the idea having been first fruitfully employed by Huygens, although Thomas Young first called it by the *name* of "energy." Let us add to this the constancy of weight (really the constancy of mass) and we shall see that with respect to mechanical energy it is involved in the very definition of the term that the capacity for work or the potential energy of a weight is proportional to the height of the level at which it is, in the geometrical sense, and that it decreases on the lowering of the weight, on transformation, proportionally to the height of the level. The zero level here is wholly arbitrary. With this, equation (2) is given, from which all the other forms follow.

When we reflect on the tremendous start which mechanics had over the other branches of physics, it is not to be wondered at that the attempt was always made to apply the notions of that science wherever this was possible. Thus the notion of mass, for example, was imitated by Coulomb in the notion of the quantity of electricity. In the further development of the theory of electricity,

the notion of work was likewise immediately introduced in the theory of potential, and heights of electrical level were measured by the work of unit of quantity raised to that level. But with this the preceding equation with all its consequences is given for electrical energy. The case with the other energies was similar.

Thermal energy, however, appears as a special case. Only by the peculiar experiments mentioned could it be discovered that heat is an energy. But the measure of this energy by Black's quantity of heat is the outcome of fortuitous circumstances. In the first place, the accidental slight variability of the capacity for heat c with the temperature, and the accidental slight deviation of the usual thermometrical scales from the scale derived from *the tensions of gases*, brings it about that the notion "quantity of heat" can be set up and that the quantity of heat ct corresponding to a difference of temperature t is nearly proportional to the energy of the heat. It is a quite accidental historical circumstance that Amontons hit upon the idea of measuring temperature by the tension of a gas. It is certain in this that he did not think of the work of the heat.[1] But the numbers standing for temperature, thus, are made proportional to the tensions of gases, that is, to the work done by gases, with otherwise equal changes of volume. It thus happens that *temperature heights* and *level heights of work* are proportional to one another.

If properties of the thermal condition varying greatly from the tensions of gases had been chosen, this relation would have assumed very complicated forms, and the agreement between heat and the other energies above considered would not subsist. It is very instructive to reflect upon this point. A *natural law*, therefore, is not implied in the conformity of the behavior of the energies, but this conformity is rather conditioned by the uniformity of our modes of conception and is also partly a matter of good fortune.

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[1] Sir William Thomson first consciously and intentionally introduced (1848, 1851) a *mechanical* measure of temperature similar to the electric measure of potential.

VI. THE DIFFERENCES OF THE ENERGIES AND THE LIMITS OF THE PRINCIPLE OF ENERGY.

Of every quantity of heat Q which does work in a reversible process (one unaccompanied by loss) between the absolute temperatures T_1 T_2, only the portion

$$\frac{T_1 - T_2}{T_1}$$

is transformed into work, while the remainder is transferred to the lower temperature-level T_2. This transferred portion can, upon the reversal of the process, with the same expenditure of work, again be brought back to the level T_1. But if the process is not reversible, then more heat than in the foregoing case flows to the lower level, and the surplus can no longer be brought back to the higher level T_2 without some *special* expenditure. W. Thomson (1852), accordingly, drew attention to the fact, that in all non-reversible, that is, in all real thermal processes, quantities of heat are lost for mechanical work, and that accordingly a dissipation or waste of mechanical energy takes place. In all cases, heat is only partially transformed into work, but frequently work is wholly transformed into heat. Hence, a tendency exists towards a diminution of the *mechanical* energy and towards an increase of the *thermal* energy of the world.

For a simple, closed cyclical process, accompanied by no loss, in which the quantity of heat Q_1 is taken from the level T_1, and the quantity Q_2 is given to the level T_2, the following relation, agreeably to equation (2), exists,

$$-\frac{Q_1}{T_1} + \frac{Q_2}{T_2} = 0.$$

Similarly, for any number of compound reversible cycles Clausius finds the algebraical sum

$$\Sigma \frac{Q}{T} = 0,$$

and supposing the temperature to change continuously,

$$\int \frac{dQ}{T} = 0 \quad . \quad . \quad .

Here the elements of the quantities of heat deducted from a given level are reckoned negative, and the elements imparted to it, positive. If the process is not reversible, then expression (4), which Clausius calls *entropy*, increases. In actual practice this is always the case, and Clausius finds himself led to the statement:

1. That the energy of the world remains constant.
2. That the entropy of the world tends toward a maximum.

Once we have noted the above-indicated conformity in the behavior of different energies, the *peculiarity* of thermal energy here mentioned must strike us. Whence is this peculiarity derived, for, generally every energy passes only partly into another form, as does thermal energy? The explanation will be found in the following.

Every transformation of a special kind of energy *A* is accompanied with a fall of potential of that particular kind of energy, including heat. But whilst for the other kinds of energy a transformation and therefore a loss of energy on the part of the kind sinking in potential is connected with the fall of the potential, with heat the case is different. Heat can suffer a fall of potential without sustaining a loss of energy, at least according to the customary mode of estimation. If a weight sinks, it must create perforce kinetic energy, or heat, or some other form of energy. Also, an electrical charge cannot suffer a fall of potential without loss of energy, i. e., without transformation. But heat can pass with a fall of temperature to a body of greater capacity and the same thermal energy still be preserved, so long as we regard *every quantity* of heat as energy. This it is that gives to heat, besides its property of energy, in many cases the character of a material *substance*, or quantity.

If we look at the matter in an unprejudiced light, we must ask if there is any scientific sense or purpose in still considering as energy a quantity of heat that can no longer be transformed into mechanical work, (for example, the heat of a closed equably warmed material system). The principle of energy certainly plays in this case a wholly superfluous rôle, which is assigned to it only from habit.[1] To maintain the principle of energy in the face of a knowl-

[1] Compare my *Analyse der Empfindungen*, 1886.

edge of the dissipation or waste of mechanical energy, in the face of the increase of entropy is equivalent almost to the liberty which Black took when he regarded the heat of liquefaction as still present but latent.[1] It is to be remarked further, that the expressions, "energy of the world" and "entropy of the world," are slightly permeated with scholasticism. Energy and entropy are *metrical* notions. What meaning can there be in applying these notions to a case in which they are not applicable, in which their values are not determinable?

If we could really determine the entropy of the world it would represent a true, absolute measure of time. In this way is best seen the utter tautology of a statement that the entropy of the world increases with the time. Time, and the fact that certain changes take place only in a definite sense, are one and the same thing.

VII. THE SOURCES OF THE PRINCIPLE OF ENERGY.

We are now prepared to answer the question, What are the sources of the principle of energy? All knowledge of nature is derived in the last instance from experience. In this sense they are right who look upon the principle of energy as a result of experience.

Experience teaches that the sense-elements $\alpha\,\beta\,\gamma\,\delta\ldots$. into which the world may be decomposed, are subject to change. It tells us further, that certain of these elements are *connected* with other elements, so that they appear and disappear together; or, that the appearance of the elements of one class is connected with the disappearance of the elements of the other class. We will avoid here the notions of cause and effect on account of their obscurity and equivocalness. The result of experience may be expressed as fol-

[1] A better terminology appears highly desirable in the place of the usual perplexing one. Sir Wm. Thomson (1852) appears to have felt this need, and it has been clearly expressed by F. Wald (1889). We should call the work which corresponds to a vanished quantity of heat its mechanical substitution-value; while that work which can be *actually* performed in the passage of a thermal condition A to a condition B, alone deserves the name of the *energy-value* of this change of condition. In this way the *arbitrary* substantial conception of the processes would be preserved and misapprehensions forestalled.

lows: *The sensuous elements of the world* ($\alpha\beta\gamma\delta\ldots$.) *show themselves to be interdependent.* This interdependence is best represented by some such conception as is in geometry that of the mutual dependence of the sides and angles of a triangle, only much more varied and complex.

As an example, we may take a mass of gas enclosed in a cylinder and possessed of a definite volume (α), which we change by a pressure (β) on the piston, at the same time feeling the cylinder with our hand and receiving a sensation of heat (γ). Increase of pressure diminishes the volume and increases the sensation of heat.

The various facts of experience are not in all respects alike. Their common sensuous elements are placed in relief by a process of abstraction and thus impressed upon the memory. In this way the expression is obtained of the features of *agreement* of entire groups of facts. The simplest sentence which we can utter is, from the very nature of language, an abstraction of this kind. But account must also be taken of the *differences* of related facts. Facts may be so nearly related as to contain the same kind of $\alpha\beta\gamma\ldots$ but the relation be such that the $\alpha\beta\gamma\ldots$ of the one differ from the $\alpha\beta\gamma\ldots$ of the other only by the number of equal parts into which they can be divided. Such being the case, if rules can be given for deducing *from one another* the numbers which are the measures of these $\alpha\beta\gamma\ldots$, then we possess in such rules the *most general* expression of a group of facts, as also that expression which corresponds to all its differences. This is the goal of quantitative investigation.

If this goal is reached what we have found is that between the $\alpha\beta\gamma\ldots$ of a group of facts, or better, between the numbers which are their measures, a number of equations exists. The simple fact of change brings it about that the number of these equations must be smaller than the number of the $\alpha\beta\gamma\ldots$. If the former be smaller by one than the latter, then one portion of the $\alpha\beta\gamma\ldots$ is *uniquely* determined by the other portion.

The quest of relations of this last kind is the most important function of special experimental research, because we are enabled by it to complete in thought facts that are only partly given. It is self-evident that only experience can ascertain that between the

$\alpha\beta\gamma\ldots$ relations exist and of what kind they are. Further, only experience can tell that the relations that exist between the $\alpha\beta\gamma\ldots$ are such that changes of them can be reversed. If this were not the fact all occasion for the enunciation of the principle of energy, as is easily seen, would be wanting. In experience, therefore, is buried the ultimate well-spring of all knowledge of nature, and consequently, in this sense, also the ultimate source of the principle of energy.

But this does not exclude the fact that the principle of energy has also a logical root, as will now be seen. Let us assume on the basis of experience that one group of sensuous elements $\alpha\beta\gamma\ldots$ determines *uniquely* another group $\lambda\mu\nu\ldots$ Experience further teaches that changes of $\alpha\beta\gamma\ldots$ can be *reversed.* It is then a logical consequence of this observation, that every time that $\alpha\beta\gamma\ldots$ assume the same values this is also the case with $\lambda\mu\nu\ldots$ Or, that purely *periodical* changes of $\alpha\beta\gamma\ldots$ can produce no *permanent* changes of $\lambda\mu\nu\ldots$ If the group $\lambda\mu\nu\ldots$ is a mechanical group, then a perpetual motion is excluded.

It will be said that this is a vicious circle, which we will grant. But psychologically, the situation is essentially different, whether I think simply of the unique determination and reversibility of events, or whether I exclude a perpetual motion. The attention takes in the two cases different directions and diffuses light over different sides of the question, which logically of course are necessarily connected.

Surely that firm, logical setting of the thoughts noticeable in the great inquirers, Stevinus, Galileo, and the rest, which, consciously or instinctively, was supported by a fine feeling for the slightest contradictions, has no other purpose than to limit the bounds of thought and so exempt it from the possibility of error. In this, therefore, the logical root of the principle of excluded perpetual motion is given, namely, in that universal conviction which existed even before the development of mechanics and co-operated in that development.

It is perfectly natural that the principle of excluded perpetual motion should have been first developed in the simple domain of

pure mechanics. Towards the transference of that principle into the domain of general physics the idea contributed much that all physical phenomena are mechanical phenomena. But the foregoing discussion shows how little essential this notion is. The issue really involved is the recognition of a general interconnexion of nature. This once established, we see with Carnot that it is indifferent whether the mechanical laws are broken directly or circuitously.

The principle of the excluded perpetual motion is very closely related to the modern principle of energy, but it is not identical with it, for the latter is to be deduced from the former only by means of a definite *formal conception.* As may be seen from the preceding exposition, the perpetual motion can be excluded without our employing or possessing the notion of *work.* The modern principle of energy results primarily from a *substantial* conception of work and of every change of physical condition which by being reversed produces work. The strong need of such a conception, which is by no means necessary, but in a formal sense is very convenient and lucid, is exhibited in the case of J. R. Mayer and Joule. It was before remarked that this conception was suggested to both inquirers by the observation that both the production of heat and the production of mechanical work was connected with an expenditure of substance. Mayer says: "Ex nihilo nil fit," and in another place, "The creation or destruction of a force (work) lies beyond the domain of human activity." In Joule we find this passage: "It is manifestly *absurd* to suppose that the powers with which God has endowed matter can be destroyed."

Some writers have observed in such statements the attempt at a *metaphysical* establishment of the doctrine of energy. But we see in them simply the formal need of a simple, clear, and living grasp of the facts, which receives its development in practical and technical life, and which we carry over, as best we can, into the province of science. As a fact, Mayer writes to Griesinger: "If, finally, you ask me how I got involved in the whole affair, my answer is simply this: Engaged during a sea voyage almost exclusively with the study of physiology, I discovered the new theory for the sufficient reason that I *vividly felt the need of it.*"

The substantial conception of work (energy) is by no means a necessary one. And it is far from true that the problem is solved with the recognition of the need of such a conception. Rather let us see how Mayer gradually endeavored to satisfy that need. He first regards quantity of motion, or momentum, mv, as the equivalent of work, and did not light, until later, on the notion of living force ($mv^2/2$). In the province of electricity he was unable to assign the expression which is the equivalent of work. This was done later by Helmholtz. The formal need, therefore, is *first* present, and our conception of nature is subsequently gradually *adapted* to it.

The laying bare of the experimental, logical, and formal root of the present principle of energy will perhaps contribute much to the removal of the mysticism which still clings to this principle. With respect to our formal need of a very simple, palpable, substantial conception of the processes in our environment, it remains an open question how far nature corresponds to that need, or how far we can satisfy it. In one phase of the preceding discussions it would seem as if the substantial notion of the principle of energy, like Black's material conception of heat, has its natural limits in facts, beyond which it can only be artificially adhered to.

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ON THE NATURE OF MOTION.

SCIENTIFIC philosophy seems to be crystallising about the doctrine of the conservation of energy as its unifying principle. It also seems to be taking the form that forces are the collisions of matter due to motion. This doctrine is not universally accepted but it has been propounded and is already widely accepted and it seems to be growing in favor by reason of its great simplicity and because it furnishes an explanation of many facts and a conceivable explanation for many more, but chiefly from the consideration which is all important, that motion is a real cause of force attested again and again. No other explanation of forces is propounded except as a reification of abstractions inherited from the ontologic age of metaphysics, and still found as an atavism in philosophy.

It is not proposed here to discuss the conservatism of energy nor the kinematic hypothesis that force is the collision of matter in motion, but to assume the theory for the purpose of exhibiting one of its logical consequences.

Every particle of matter known to man is in motion at a high velocity. This wooden ball is in motion about the axis of the earth, about the sun, and also with the sun about some other point in the heavens. The sum of all these motions considered as velocity is unknown, but this may be affirmed with safety, that it is very great. Let us call this the stellar motion of the ball. Its trajectory is composed of at least three great revolutions.

Great as the velocity of the stellar motion is, it is yet small as compared with other motions within the body itself. As now understood the woody tissue is composed of cells, the cells of mole-

cules and the molecules of atoms, all grouped in such a manner by composed motion as to constitute a tissue whose structure is dependent upon molecular motions. That rigidity is sometimes due to motion is well known. Stand by the nozzle of a monitor with four hundred feet of pressure behind the water and watch the stream drive the great boulder away. Strike this stream with a crowbar; though the iron may bend the stream is unbroken. So we may conceive that rigidity and strength of structure are properties of motion. Let us call this rigidity and structural strength of the woody tissue constitutional motion, whose force is equal to the sum necessary to rend the ball into its constituent atoms. The structural strength is a measure of its constitutional motion which is great as compared with any molar motion observed in the ball. Again, the body exhibits a mode of motion known as heat which is undulatory or vibratory. Something of the velocity of heat is known and it is well known that it is very great as compared with the molar motion observed in the bodies which furnish the heat. Let us call this structural and thermic motion molecular motion.

I roll the ball over the floor and molar motion is exhibited to the vision.

Thus we know of three kinds of motion possessed by the body, but that which is apparent to the unaided vision is but a minute part of the whole. It is evident that it is a very small part of the stellar motion. Let us now see what proportion it bears to the molecular or the constitutional and thermic motion combined. The constitutional motion is measured by the force with which the atoms, molecules, and cells are held together as an organic body. If we attempt to realise this we find it very great, yet we cannot attain to its measure from the fact that it is complicated with the heat motion of the body, but we can obtain some realisation of the sum of the two kinds of motion, though we cannot with certainty divide the cryptic motion between them.

Let the ball be burned and its atoms set free into the air. The disturbance which they cause as they depart is known as light. The light travels at more than a hundred thousand miles per second, that is, it causes a disturbance in the ether which is propagated at

that rate by the collisions of the atoms against the particles of ether. There are conditions under which this light may travel at the rate of five hundred thousand miles per second. Now, that these atoms may cause such collisions they must be moving at least at an equal rate at the instant they dissolve from the wooden ball. The constitutional motion of the body transformed into heat and added to its original heat therefore, must equal the light motion which the burning ball produces. Hence we must conclude that the molecular motion of the ball must be at a rate of at least a hundred thousand to five hundred thousand miles per second. Add this motion, whatever it may be, to the stellar motion, whatever it may be, and the sum is very great.

None of these motions are persistently right line motions. It is manifest that the stellar motions are great revolutions. The constitutional motions are also enormously composite. The heat motions, though they may be right-line motions in minute parts, must be composite motion—their paths forever changing, else the body would be dissipated. The molecular motion of each molecule in the body, though proceeding at a high velocity, greater than a hundred thousand miles per second, has its path or trajectory confined to the sphere of the molecule itself. Considering this molecular motion, not in relation to stellar motion nor in relation to molar motion, but wholly in its relation to the particles of the molecule, it must be highly composite. The molar motion of the rolling ball is revolution and translation, but it is so small as compared with the others that it hardly seems worthy of consideration. Still it must not be neglected, for this is the motion the characteristics of which we have set out to explain. Let us once more consider what has been said. The atoms of the ball when all their motions are analysed and summed prove to have enormous velocities in enormously composite paths compared with which the molar motion of the ball on the floor sinks into insignificance.

Every particle in the wooden ball rolling on the floor has stellar motion, molecular motion, and molar motion. Consider one of these particles moving with the three kinds of motion and we realise that its velocity is very great, and that the path which it trav-

erses is greatly composite. If such a particle had its composite path straightened into a right-line trajectory, it would in a few seconds pass out of the sphere of the solar system into a region beyond, from whatever point within the system it might start and in whatever direction the right-line path extended. But the molecule remains within the solar system because its stellar motion is composite, and it remains within the ball because its molar motion is composite, and it remains within the molecule because its molecular motion is composite. We have, thus, with regard to every one of the particles of the ball, two facts of motion to consider: First, great velocity, second, great complexity of path.

Every collision of one atom with another must produce an effect upon both. The particles *A* and *B* collide. *A* acts on *B* and *B* on *A*, so that there is both action and reaction in each, and action and passion in each. The action of *A* equals the reaction of *A*. The action of *B* equals the reaction of *B*. The action of *A* equals the passion on *B*, and the action of *B* equals the passion on *A*, thus there is a double correlative.

By such a collision no motion can be acquired and no motion can be lost; for motion is indestructible by our hypothesis; but the effect of the collision will certainly be a change in direction or deflection. We know of deflection, but is there something else beside deflection? In the current doctrines of physics a something else is affirmed or assumed, that something else being an increase of the velocity of one body accompanied by an equal decrease of velocity in the other, which invalidates the law of motion, that action and reaction are equal; and thus a contradiction is reached. If one of the particles gains motion its action is less than its reaction; if one loses motion its reaction is less than its action. If action and reaction are equal, then neither of the colliding particles can have its velocity increased or diminished. In this double correlative of action and reaction and action and passion the truth must be found and the lurking error discovered.

But the wooden ball was set rolling. Was not motion as velocity added to the ball when it started and subtracted from it when it was stopped?

When the ball was started molar motion began and when stopped that molar motion ended. But we do not suppose that it came out of nothing and evanished in nothing; we resort to pre-existing molecular motion to explain it; we say that the molar motion was derived from the molecular motion of the hand that set the ball rolling and that it was transformed into molecular motion in the wall which destroyed the molar motion. In making this explanation we assume that motion went out of the hand into the ball and then out of the ball into the wall. Is this true? Was the velocity of the molecular motion in the hand diminished and the velocity of the molecular motion in the wall increased? If so, action and reaction are not equal.

Did velocity go out of the hand into the ball, or was the mode of motion existing in the ball changed? Did velocity go out of the ball into the wall or was the mode of motion existing in the wall changed? If the law of action and reaction is valid, when the change was made upon the ball by the hand, an equal change was made upon the hand by the ball. Neither of them lost velocity by the changed form. When the ball struck the wall neither ball nor wall lost velocity, but both changed their mode of motion by collision. The form or mode of motion was affected, the quantity of motion as velocity was unaffected. But there was a change in the hand, in the ball, and in the wall. In what did that change consist? We know that in part at least it consisted in the change of direction. The molecular motions in the hand must have had their directions changed; the molecular motions in the ball must have had their directions changed; in like manner the molecular motions of the wall were changed in direction. This we know: in every collision there is a change of direction in the motion of the particles constituting the bodies colliding. Is this change of direction all? Or is there a transference of velocity so that one loses while another gains? The whole problem is narrowed to this issue—that which we call acceleration is wholly deflection or in part deflection and in part loss and gain—loss of velocity by one and gain by another, and if there is any loss and gain then action and reaction are not equal.

Imagine a man walking in a circle of ten feet radius. The

sphere of his motion is within that circumference. He may soon walk a mile and never be more than thirty feet away from any given point in the circumference; change his direction so that his path is straightened, and he may soon be a mile away. A body of men walking in a circle remain together as a body within the circumference of the circle. Instantaneously change their paths to parallel right lines, and as a body they may soon be a mile away and still in a circle. In the same manner the molecules of the wooden ball are in motion within the theatre of the ball, so that they do not pass beyond its boundaries, yet impose upon each molecule a change of direction in such manner that they all move a little more in one course and a translation of the ball is effected by a change of direction in the motion of its constituent molecules, and the ball still remains as an incorporate body. It is thus possible to explain molar motion of the ball as a change in direction of the motion of its molecular parts, without assuming an increase of velocity in the parts. By such an assumption the molar motion perceived by vision would be legitimately derived from the molecular motion known by reason; no motion would be created or destroyed, and action and reaction would remain equal, while the apparent molar motion would be explained by a change of direction very minute as compared with the composite paths of the several molecules. It is thus that when we consider the total motions of the atoms of the ball even when it is shot from a cannon's mouth, an inconceivably small change of direction in the motion of every atom as compared with the complexity of its path would fully account for the flight of the ball as projected by dynamite.

Now we know of deflection and that it arises from collision, and we know of no other change in motion. Acceleration as increase of velocity cannot in the nature of the case be demonstrated, for it may be always explained as deflection and can never be explained without deflection; and to assume acceleration as increase of velocity is to contradict the law that action and reaction are equal. If acceleration is explained as deflection it is explained by referring it to a known cause and adequately explained.

The pendulum swings. Its molar motion seems to come to

rest. Gradually it moves again on its return path, and the swing is repeated over and over. Apparently its motion is destroyed and created at every vibration, and this is true of its molar motion. But now we must consider that this seen vibration is but a part of its motion. It has stellar and molecular motion. It is a body composed of many atoms, and the molar motion constitutes but a minute part of the total motion. To properly understand its motion of swing we must discover the relation of this minute part to the grand total. Are we sure that velocity is added to the grand total, or is it a change in the direction of the multiform motions of the body, stellar, constitutional, and thermic, of inconceivable minuteness? For it is possible thus to explain the molar motion. We know that the direction of motion can be changed, and we resort to a known cause in thus explaining it. If we attempt to explain it as an increase in velocity we resort to an unknown cause, for it can never be shown that any change in motion is increase of velocity. If the third law of motion is true our explanation is valid.

But the pendulum was set in molar motion by a collision with the hand, and it returns to apparent rest after many collisions with the molecules of the air. That which was made to appear to the vision as molar motion was derived from collision and is lost in collision. Did anything but collision go out of the hand through the pendulum and into the air? Was the velocity of the air-particles permanently increased thereby and the velocity of the hand-particles permanently diminished thereby? This is the problem we are seeking to solve. If motion left the hand and was discharged into the air, then motion may be dissipated and the first law of motion is an illusion; but if the changes wrought are explained as collisions, then the law remains and the illusion is one of the sense of vision, easily and simply explained; for vision takes no cognisance of stellar and molecular motion but only of the molar motion; and we are compelled to resort to our knowledge of cryptic motion in order to explain the movements of the pendulum as being other than a creation out of nothing and an annihilation into nothing. The explanation by vision is held to be absurd, but if we go beyond vision into the realm of reason we discover that motion can never be created

nor destroyed, and we discover still further that action and reaction are equal and that therefore one particle of matter can never yield its motion to another. But vision and reason alike testify to the existence of collision and to the deflection which results therefrom, and hence we are compelled to believe that the apparent motion of the pendulum was not created for the occasion nor borrowed for the occasion but only deflected for the occasion.

Yet, again, this ball of wax is before the fire; the fire gives it heat and the wax is warmed until at last it melts. In the flame constitutional motion is transformed into heat, this heat is radiated through the ether to the wax; the wax itself becomes heated and melts. Does some motion in the gas depart therefrom and pass into the wax? Or do the atoms of the flame collide against the atoms of the ether which again collide against the atoms of the wax in such a manner that the constitutional motion of the wax is transformed into thermic motion? The latter is the explanation which must be given under the hypothesis that motion is persistent in each particle and that collision results only in change of direction. By such explanation we resort to a known cause of change; but if motion itself is transmitted by collision and not simply change of direction, then the law of action and reaction is disproved. The hypothesis of persistent motion in the presence of Newton's third law of motion compels us to the conclusion that collision occurs which results only in change of direction, that the force of heat is collision resulting from motion which persistently inheres in the several particles and which produces an effect upon the particles composing the body heated, and that this effect is a change in the direction of the motion of its molecular particles in such a manner that constitutional motion is transformed into thermic motion.

The motion of the heat in the flame was derived from the constitutional motion of the wood in the grate. Was any motion transmitted? Gather the particles of combustion and we have gases in which motions are discovered equivalent as forces to the structural forces of the wood itself, and these are known as the kinetic forces of the gas. The motion in the wood equals the motion in the gas, for action and reaction are equal.

All explained forces are found to be collisions. Perhaps gravity cannot thus be explained but there are many physicists who believe that it can thus be explained by transforming the theory of La Sage from terms of a fluid to terms of motion. By this explanation gravity would be explained as collision through the interception of collisions by the gravitating bodies. With this explanation the law of gravity is explained and remains valid and there appears to be no substantial reason for the rejection of this gravitational theory.

In all nature we discover these antagonistic forces; constitutional force and thermic force. If thermic force is greater, constitutional force is less; the body tends to dissolve or is dissolved. And *vice versa*, if the thermic motion is diminished, the constitutional motion is increased, and in no case can it be shown that one is increased without the other being diminished. The heating of the body therefore adds nothing to its motion but only transforms the motion which it already has into another mode. And *vice versa*, the same is true with any cooling process. When we come to consider all the motions of the body we never have reason to suppose that the total is increased or diminished. No increase or diminution can ever be discovered but we always have substantial reasons to suppose that directions are changed and every change of motion can be accounted for as change of direction, and the third law of motion remains valid.

It thus appears that to interpret acceleration as increase of velocity rather than as deflection is to fall into an illusion of the senses, which unaided deal only with molar forms of motion, and it should be further considered that these molar forms with which the senses deal constitute but an infinitesimal part of the total motions inhering in every body of matter. We know of acceleration as deflection, we do not know acceleration as increase of velocity, and there can be no increase of velocity if the third law of motion is valid. It is well recognised in modern physics that acceleration is sometimes deflection, but it is sometimes held to be increase of velocity, and it is believed that in so far as it is increase of velocity it is not deflection, and in so far as it is deflection it is not increase of

velocity. But claim is here made as a universal law that acceleration is deflection.

Let this argument be stated in brief:

First, the tendency of modern investigation is to explain all forces as derived from modes of motion. Great progress has been made in this direction and the theory is widely accepted.

Second, all forces are collisions.

Third, if all forces are collisions the motions from which they result obey the third law of motion, that action and reaction are equal. By this law it is seen that no motion can be lost or gained by any particle of matter.

Fourth, collisions can be transmitted but motion cannot be transmitted.

Fifth, in molar motion there is an apparent creation and annihilation of motion, but this appearance is known to be an illusion. It has been explained as due in part to collision and in part to the transmission of motion. But such transmission contradicts the third law of motion. Acceleration, therefore, must be something else than increase of velocity. It is known to be in part deflection and can all be thus explained; and if the first law of motion is universally valid it is thus explained. Therefore:

1. Acceleration is deflection.
2. The velocity of motion is constant.
3. The direction of motion is variable.
4. MOTION IS INHERENT IN MATTER AND IS NOT IMPOSED UPON IT FROM WITHOUT.

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BUDDHISM AND CHRISTIANITY.

EXPOSITION.

CHRISTIANITY, including Roman and Greek Catholics, the Protestants and all the smaller sects, may lay claim to about twenty-six per cent. of the inhabitants of the earth, and ranks, in number of adherents, as the second greatest religion. It is considerably surpassed by Buddhism which is calculated by Prof. Rhys Davids to count five hundred million adherents, or forty per cent. of all the inhabitants of the earth.[1] The next religions in order are Hinduism with thirteen, and Islam with twelve and one half per cent. In addition we have one half per cent. Jews, and eight per cent. of other creeds of less importance.

Now it is a strange fact that Buddhism and Christianity, constituting together sixty-six per cent., which is considerably more than one half of mankind, possess several most important features in common, and their agreement cannot be a product of mere chance. It is well known that many Christian missionaries, for instance, Huc and Gabet, the Jesuits,[2] were quite at a loss to account for so many

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[1] For details see the statistical tables on pp. 4–5 of Rhys David's *Buddhism* published in the series of *Non-Christian Religious Systems*, London, 1890.

The objection has been made that the Chinese Buddhists are at the same time adherents of Confucius and Tâo and it is claimed that if the number of Buddhists were reduced to those who are true Buddhists, and nothing but Buddhists, Christianity could easily be proved to be numerically the first religion of the world. This may be true, but is this method of using statistics legitimate? Would it not in that case be fair to apply the same restriction to both sides? The number of Christians would shrink in no less degree if we counted the real Christians, or at least the confessed Christians only, which in the United States would reduce them to the churched people who are less than one-tenth of the entire population.

[2] Quoted in *The Monist*, Vol. IV, No. 3, p. 418.

striking coincidences, and Bishop Bigandet, the Apostolic Vicar of Ava and Pegu, writes:

"Most of the moral truths, prescribed by the Gospel, are to be met with in the Buddhistic scriptures. . . . In reading the particulars of the life of the last Buddha Gaudama, it is impossible not to feel reminded of many circumstances relating to our Saviour's life, such as it has been sketched out by the Evangelists."

The idea of a Buddhistic origin of Christianity has been suggested more than once; but it is incumbent upon us to state that some of the men who must be regarded as the most competent to judge this matter are either extremely reticent or scorn the suggestion as quite impossible. While it is true that Arthur Lillie and Rudolf Seydel, who have done most to make the theory popular, introduce many vague speculations, we cannot regard a refutation of some of their vagaries as sufficient to settle the subject. No argument has as yet been offered to dispose of the hypothesis, which possesses, to say the least, a great probability in its favor. It is our intention here to enumerate some of the most salient facts so as to show them in their full importance, in the hope that specialists will give us more light on the subject. We repeat the motto which Albrecht Weber inscribed upon the title-page of his *Indische Literaturgeschichte:*

"Nil desperari!
Auch hier wird es tagen."

The agreement of the ethical spirit of both religions, Buddhism and Christianity, appears the more striking from our being confronted with an obvious difference between their dogmatologies. Christians believe in God, soul, and immortality, while Buddhists aspire to reach Nirvâna. They have no such terms as God and soul. On the contrary, they reject the ideas of a personal Creator of the world and of an indissoluble soul-unit, an âtman, or ego-entity in man, and thus they are decried by Christians as atheists and deniers of the existence of the soul. Having explained in a previous article that Buddhism is not negative, that its Nirvâna is neither more nor less positive than the Christian heaven, and that Buddha only rejects the gratuitous assumption of a metaphysical soul-agent behind the soul, not the existence of the soul itself, we shall now review

the most obvious similarities and dissimilarities of Buddhism and Christianity; and we come to the conclusion that, *supposing no historical connexion exists between the two faiths, their agreement must be regarded as very remarkable;* for in that case we must recognise the fact, that *both Buddhists and Christians, facing the same problems of life, solve them in a similar spirit although using different modes of expression.* It would go far to prove that *the basic truths of both religions are deeply rooted in the nature of things* and cannot be supposed (as is the theory of supernaturalistic dualism) to stand in contradiction to the cosmic order of the world or to the laws according to which social institutions develop.

BUDDHA AND CHRIST.

Let us briefly recapitulate the similarities between Buddhism and Christianity.

According to the sacred legends, Buddha, like Christ, was of royal, not of priestly, lineage; and his life while he was still a babe was jeopardised on account of the transcendent glory of his future. The chapter entitled "The Fear of Bimbisâra,"[1] contains a parallel to the story of Herod's massacre of the infants in Bethlehem. The state ministers of Maghada make inquiry if there be any one capable of depriving the king of his regal power. Two of their messengers find among the Shâkyas an infant newly born, the first begotten of his mother, who would either become a universal monarch or a Buddha. On their return they exhort the king "to raise an army and destroy the child, lest he should overturn the empire of the king." But Bimbisâra (unlike Herod of the New Testament) refuses to commit the crime.

The same story is told of Krishna, who is persecuted as an infant by the tyrant of Madura. The latter, unable to find the boy, ordains the massacre of all the children of male sex born during the night of Krishna's birth.

Both Buddha and Christ led a life of poverty. Both wandered about without a home, without a family, without property. They

[1] Beal, *Romantic History of Buddha*, pp. 103–104.

lived like the lilies of the field, and preached to all people, to rich and poor alike, without distinction of class, the gospel of the deliverance from evil.

Both Buddha and Christ, according to the canonical books of their respective religions were hailed soon after their birth, as the saviours of the world, by celestial spirits, by a religious prophet, and by sages. Dêvas, like the angels in the Christian Gospel, sing hymns. Asita is the Christian Simeon; the Nâga-râjas are the Magi. Aged women are also mentioned, who, like Anna, bless the baby.[1]

We read in the Tibetan *Life of Buddha*[2]:

"It was the habit of the Çakyas to make all new-born children bow down at the feet of a statue of the yaksha Çakyavardana; so the king took the young child to the temple, but the yaksha bowed down at his feet. . . . When the king saw the yaksha bow at the child's feet he exclaimed, 'He is the god of gods!' and the child was therefore called Devatideva."

The apocryphal Gospel of Pseudo-Matthew contains a similar passage[3]:

"Now it came to pass that when the most blessed Mary, with her little Infant, had entered the temple, all the idols were prostrate on the earth, so that they all lay upon their faces wholly shattered and broken."

Both Buddha and Christ excelled their teachers. Both were greeted by a woman who was delighted with their personal beauty. The "noble virgin Kisâ Gotamî" bursts forth into the song:

"Blessed indeed is the mother,
Blessed indeed is the father,
Blessed indeed is the wife,
Who owns this lord so glorious."—*Birth Stories*, p. 80.

This reminds one of the incident mentioned in Luke xi, 27:

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[1] See Ashvaghosha's *Life of Buddha*, verses 39-40.—*Sacred Books of the East*, (afterwards cited as S. B. of E.) vol. xix, pp. 1–20.

[2] *The Life of Buddha and the Early History of His Order, Derived from Tibetan Works in the Bkah-Hgyur and Bstan-Hgyur*, translated by W. Woodville Rockhill, p. 17. See also S. Beal, *Romantic History of Buddha*, p. 52.

[3] *The Apocryphal Gospels*, tr. by B. Harris Cowper, 4th ed. p. 63. See also *The Arabic Gospel of the Infancy*, *ibid.*, p. 178.

"And it came to pass, as he spake these things, a certain woman of the company lifted up her voice, and said unto him, Blessed is the womb that bare thee, and the paps which thou hast sucked."

The word *Nibbuta*, i. e. "blessed, happy, peace," reminds Buddha of *Nibbuti*, i. e., *Nibbana*.[1] He says:

"By what can every heart attain to lasting happiness and peace?

"And to him whose mind was estranged from sin the answer came, 'When the fire of lust is gone out then peace is gained; when the fires of hatred and delusion are gone out, then peace is gained; when the troubles of mind, arising from pride, credulity, and all other sins, have ceased, then peace is gained!' Sweet is the lesson this singer makes me hear, for the Nirvâna of Peace is that which I have been trying to find out. This very day I will break away from household cares! I will renounce the world! I will follow only after the Nirvâna itself!"

In a similar spirit Christ replies (Luke xi, 28):

"Yea, rather blessed are they that hear the word of God, and keep it."

Both Buddha and Christ were tempted by the Evil One.[2]

Both Buddha and Christ confessed their mission to be the establishing on earth of a kingdom of righteousness;[3] they sent out their disciples to preach the gospel. Said Buddha:

"Go ye now, O Bhikkhus, and wander, for the gain of the many, for the welfare of the many, out of compassion for the world, for the good, for the gain, and for the welfare of gods and men. Let not two of you go the same way. Preach, O Bhikkhus, the doctrine which is glorious in the beginning, glorious in the middle, glorious in the end, in the spirit and in the letter; proclaim a consummate, perfect, and pure life of holiness. There are beings whose mental eyes are covered by scarcely any dust, but if the doctrine is not preached to them, they cannot attain salvation. They will understand the doctrine. And I will go also, O Bhikkhus, to Uruvelâ, to Senâninigama, in order to preach the doctrine."[4]

Both Buddha and Christ refused to find recognition by pandering to the superstitions of those who seek for signs;[5] Buddha posi-

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[1] *Birth Stories*, p. 80, and Spence Hardy, *Manual*, p. 160.

[2] Compare Ashvagosha's *Life of Buddha*, chapter xiii, "Defeats of Mâra, S. B. of E., vol. xix, p. 147, with Luke iv. 2, Matth. iv, 1–7, Mark i, 13.

[3] See the *Dhamma-chakka-ppavattana-Sutta*,—viz., on "The Foundation of the Kingdom of Righteousness,"—S. B. of E., vol. xi, p. 146, and Bigandet, p. 125.

[4] See *Mahâvagga* i, ii, p. 112, S. B. E., vol. xiii; compare also Ashvaghosha's *Life of Buddha*, p. 183, with Mark iii, 14, and Luke ix, 2.

[5] See Luke xi, 16, and *passim*.

tively forbade miracles.[1] And yet to both innumerable miracles were attributed.

Of both we read that they walked on the water. The origin of the Buddhist legend can be traced to the allegorical expression of crossing the stream of worldliness (samsâra) and reaching the other side, which is the shore of celestial rest (Nirvâna). There is no such spiritual meaning in Christianity, or, if there was one, the metaphor has been obliterated.

At a marriage-feast both Buddha and Christ miraculously helped the host to entertain his guests. In Buddha's presence, as we are told in the story of the marriage-feast at Jambunada,[2] a small supply of food proves over and over sufficient for a great number of guests. The idea of turning water into wine, at the marriage at Cana,[3] is un-Buddhistic.

Both Buddha and Christ tried asceticism for a time, and carried their fasts to the extreme. We read:

"Each day eating one hemp grain, his bodily form shrunken and attenuated, seeking how to cross (the sea of) birth and death, exercising himself still deeper and advancing further." (Ashvaghosha's *Life of Buddha*, verse 1007.)

But both gave up these methods of gaining holiness by self-mortification for a middle way.[4] Both were in consequence of it suspected by former believers of flagging in religious zeal.[5]

Both Buddha and Christ were powerful preachers, fond of parables, and concentrating their teachings in pithy aphorisms, which were both impressive and easily remembered. Both were keen thinkers, and invincible in controversies, as a rule, bringing the debate to a climax by presenting a dilemma, and always pressing the moral application of their theories. Both exercised an extraordinary influence; they looked into the hearts of men and swayed their

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[1] See W. W. Rockhill's *Life of Buddha*, pp. 68–69.

[2] *Fu Pen Hing Tsi King*, translated by Beal.

[3] John ii, 1, et seq.

[4] *Dhammapada*, verse 227; Chinese version of the *Dhammapada*, translated by Beal, p. 122.

[5] Compare Ashvaghosha's *Life of Buddha*, verses 1024, and 1222–1224, with Luke vii, 19, Matth. xi, 3.

minds through purity of motive and the authoritative earnestness of their personality. Both objected to the traditional method of clinging to the letter of religious belief which is satisfied with rituals and prayers, and both substituted for it the spirit of religious devotion and moral conduct.[1] Both loved to express their sentiments in paradoxes, such as, "By giving away we gain; by losing our soul we preserve it; by non-resistance we conquer." And both spoke in parables.[2] Many subjects of their parables are the same; as such we mention the sower[3] and the lost son;[4] the worldly fool who builds a large residence with store-rooms, but dies suddenly;[5] the comparison of good deeds to seeds sown on good and bad soil, according to the nature of the people, illustrating the truth that in bad people the passions choke the growth of merit. Buddha calls the Brahmans, and Christ the Pharisees, "blind leaders of the blind."[6]

Both Buddha and Christ show an unexpected graciousness toward a woman sinner;[7] and a Buddhist disciple had an encounter with a woman at a well analogous to that of Christ in Samaria.[8]

Both Buddha and Christ were, like Krishna,[9] transfigured shortly before death,[10] and above all, both inculcated the utter extinction of desire, lust, and hate in their very germ, so as to forbid

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[1] As an instance of Buddha's method of spiritualising religious rites see the *Sigâlovâda Sutta* in *Sept Suttas Pâlis*, by M. P. Grimblot (Paris), p. 311.

[2] "'Powerful in making comparisons,' is one of Buddha's characteristic names." —Beal, foot-note to Ashvaghosha's *Life of Buddha*, verse 1915, S. B. of E., xix, p. 280.

[3] *Sutta Nipâta*, p. 11–15, S. B. of E., Second Part.

[4] *Saddharmapundarika* iv.

[5] Beal, *Translation of Chinese Dhammapada*, p. 77.

[6] Compare Matthew xv, 14, with *Tevigga Sutta*, i, 15, and *Lalita Vistara*, p. 179. See also Beal's *Romantic History of Buddha*, p. 106, where the phrase occurs, "Like a blind man who undertakes to lead the blind."

[7] See the story of Ambapâli in *Mahâvagga* vi, 30. The courtesan Ambapâli is called "Lady Amra" in Ashvagosha's *Life of Buddha*, p. 255–256.

[8] Compare John v, et seq., with Burnouf's *Introduction*, p. 205.

[9] The transfiguration of Krishna serves the purpose of strengthening the faith of his followers in the presence of danger. See Jacolliot, *The Bible in India*, p. 306.

[10] Compare Matthew xvii, 2, and Mark ix, 2, with *Mahâparinibbâna Sutta* iv, 47, 52.

all assertion of self, even the resistance to evil, and both demand the practice of love of enemies.[1]

SIMILARITIES IN TEACHING.

There are, in addition, numerous coincidences in their utterances, so that many of the sayings of Christ and Buddha appear like two different reports of the same speech. Thus we read in the *Sutra of Forty-two Sections*, 10:

"It is difficult for the rich and noble to be religious."

And Christ said (Matthew xix, 24, Mark x, 25, and Luke xviii, 25):

"And again I say unto you, It is easier for a camel to go through the eye of a needle, than for a rich man to enter into the kingdom of God."

The Dharma is frequently compared to living waters, as in John iv, 14, vii, 38, Rev. xxi, 6, xxii, 17, and to a pearl, or a jewel, as in Matthew xiii, 45–46, while Nirvâna is described as a city of peace and an island of jewels,[2] similarly as the new Jerusalem.

Yashas, the noble youth of Benares,[3] visits Buddha in the night, like Nicodemus;[4] but if Nicodemus had been a Brahman, he would not have been mystified by Christ's proposition of the necessity of a spiritual rebirth; he would have understood the expression. The term "twice born" or "reborn" is still among Buddhists a title of honor given to priests and other men of distinction.

The coming of the Tathâgata (Buddha) is likened to the wind. We read in *The Questions of King Milinda*, page 148:

"As the great and mighty wind which blew, even so, great king, has the Blessed One blown over the ten thousand world-systems with the wind of his love, so cool, so sweet, so calm, so delicate."

How similar, although less clear, is the passage in John iii, 8:

"The wind bloweth where it listeth, and thou hearest the sound thereof, but

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[1] Compare *Dhammapada*, 5, "Hatred ceases by love," and many other passages, with Matthew v, 44, "Love your enemies."

[2] See *Dhammapada*, p. 181.

[3] Ashvaghosha's *Life of Buddha*, p. 180, *Mahâvagga*, i, 7.

[4] See John iii, 2.

canst not tell whence it cometh, and whither it goeth: so is every one that is born of the Spirit."

The Dharma (viz., religion) is said to be like the salt of the ocean, one in taste throughout, which reminds us of Jesus saying that his disciples are the salt of the earth;[1] and the exhortation is made by both Buddha and Christ to lay up treasures that are incorruptible and inaccessible to thieves.[2]

Giving is praised in preference to receiving. In Ashvaghosha's *Life of Buddha*, 1516–1517, we read:

"Giving away our food, we get more strength; giving away our clothes, we get more beauty," etc. (S. B. of E., p. 215.)

In *The Questions of King Milinda* we find among the discussions concerning apparent contradictions explained by Nagasêma, that "the Dharma of the Tathâgata shines forth when displayed" (p. 264), which is contrasted with the injunction, "Do not let the Dharma . . . . fall into the hands of those unversed with it" (page 266). Both passages find their parallels in the Christian Gospel, the former in Matthew v, 16, "Let your light shine before men," and the latter in Matthew vii, 6, "Do not cast your pearls before swine."

Buddha says (in the *Sutra of Forty-two Sections*, 28) "Guard against looking on a woman," and (in Buddhaghosha's *Parables*, p. 153) he comments upon the law "commit no adultery," that it "is broken by even looking at the wife of another with a lustful mind." Christ expresses the same idea in almost the same words, saying: "Whosoever looketh on a woman to lust after her, has committed adultery with her already in his heart." (Matthew v, 28.)

The sentence, "If thy right eye offend thee pluck it out," (Matthew v, 29), finds a parallel in the words:

"Better far with red-hot iron pins bore out both your eyes, than encourage in yourself lustful thoughts." (Ashvaghosha's *Life of Buddha*, 1762–1763.)

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[1] *Questions of King Milinda*, iii, 7, 15, and *Chullavagga* ix, 1, 4, which compare with Matthew v, 13.

[2] Compare *Nidhikandasutta*, the treasure chapter, where we read of "A treasure that no wrong of others and no thief can steal," with Matthew vi, 20.

"The armor of God" is described by St. Paul (Eph. vi, 13–17):

"Wherefore, take unto you the whole armor of God, that ye may be able to withstand in the evil day, and having done all, to stand.

"Stand, therefore, have your loins girt about with truth, and have on the breastplate of righteousness;

"And your feet shod with the preparation of the gospel of peace;

"Above all, taking the shield of faith, wherewith ye shall be able to quench all the fiery darts of the wicked.

"And take the helmet of salvation, and the sword of the Spirit, which is the word of God."

This reminds us of Ashvaghosha's *Life of Buddha*, 1761–1762:

"Take, then, the bow of earnest perseverance, and the sharp arrow-points of wisdom.

"Cover your head with the helmet of right thought, and fight with fixed resolve against the five desires."

In the *Lalita Vistara* (page 122) we read of the "World" that "it is like a city of sand. Its foundations cannot endure," which reminds us of Matthew vii, 26.

Matthew xxiv, 35: "My words shall not pass away," finds a parallel in *Buddhist Birth Stories*, p. 18: "The word of the glorious Buddhas is sure and everlasting."

Both Buddha and Christ point out to their adherents the good example of worldly people. Buddha says, when rebuking his disciples for improper behavior:

"Even the laymen, O bhikkhus . . . . will be respectful, affectionate, hospitable to their teachers. Do you, therefore, O bhikkhus, so let your light shine forth that you having left the world . . . . may be respectful, affectionate, hospitable to your teachers," etc. (*Mahâvagga* V, 4, 2, xvii, p. 18.)

And Christ says:

"If ye love them which love you, what reward have ye? Do not even the publicans the same? And if ye salute your brethren only, what do ye more than others? Do not even the publicans so?" (Matth. v, 46–47.)

Christ complains, in Matth. xi, 16–19, of the childish nature of the people whom no one can satisfy, neither John the Baptist who did not eat and drink nor the Son of Man who did eat and drink. In the same spirit Buddha says:

"They blame the man of many words, they blame the patient and quiet man, they also blame the man who seeks the happy medium." (See Beal's *Translation of the Chinese Dhammapada*, sect. xxv, p. 122. Compare *Pâli Dhammapada*, v. 227).

It is a curious coincidence that Christ, when speaking of the signs of the coming of the Son of Man, mentions "the fig tree's putting forth leaves" (Matth. xxiv, 32), while we read in the *Saddharmapundarîka*, ii, 134–136, S. B. of E., p. 58:

"At certain times and at certain places, somehow do leaders appear in the world . . . . just as the blossom of the glomerous fig-tree is rare, all so wonderful, and far more wonderful is the law I proclaim."

As the coming of the Son of Man, so his parting from life is expressed in words which present a certain similarity to Buddhistic passages. Christ says:

"Ye shall not see me" (St. John xvi, 16),

and again (Matth. xxiv, 23.)

"If any man shall say unto you, Lo, here is Christ, or there, believe it not."

The *Brahmajâla Sutta* (translated by Gogerly in *Sept Suttas Pâlis*, p. 59) although in a different sense also speaks of Buddha that he shall not be seen again. We read:

"That which binds the teacher to existence is cut off, but his body still remains. While his body still remains he will be seen by gods and man, but after the termination of life, upon the dissolution of the body, neither gods nor men will see him." (P. iii.)

THE MURDER OF PARENTS.

Remarkable as these parallels are, some of which are apparently incidental, some striking, some simply curious, the list is by no means exhausted.[1] Let me now add a passage in which the Buddhist version may be hoped to throw light upon the Christian narrative.

[1] Rudolf Seydel calls attention to a curious similarity of sound between important names. such as Mâyâ and Maria, Ânanda and Johannes, Sariputra and Peter, Devadatta, and Judas, each two of these characters, strange to say, being representative of the very same type and playing the same parts, those in Buddha's, these in Christ's life. But we have to add that the names Miryam, and Simeon Kephas, the Hebrew originals of Maria and Peter, resemble their Buddhistic counterparts very little and exhibit a remarkable instance of an incidental resemblance warning us not to take even striking coincidences as evidences of appropriation.

Christ's words in Matth. x, 21, "The children shall rise up against their parents and cause them to be put to death," have startled Christians in no less degree than an analogous passage in the Buddhist canon has the Buddhists. We read in the *Dhammapada*, verse 295 :

"A true Brahman goes scatheless, though he have killed father and mother and two holy kings and an eminent man besides."

Says the translator in the footnote on page 71 :

"D'Alois following the commentary explains mother as lust, father as pride, the two valiant kings as heretical systems, etc."

And Beal quotes in the Introduction to his *Translation of the Chinese Dhammapada* the following Buddhistic comment :

"Is not love (*Tanhâ*) which covets pleasure more and more, and so produces 'birth'—is not this the mother (*mâtâ*) of all? And is not 'ignorance' (*avidyâ*) the father (*pitâ*) of all? To destroy these two, then, is to slay father and mother. And again, to cut off and destroy those ten '*kleshas*' (Ch. *shi*) which like the rat or the secret poison, work invisibly, and to get rid of all the consequences of these faults (i. e., to destroy all material associations), this is to wound a Rahat. And to cause offence and overthrow a church or assembly, what is this but to separate entirely the connexion of the five *skandhas*? ('five *aggregates*,' which is the same word as that used above for the church). And again to draw the blood of a Buddha, what is this but to wound and get rid of the seven-fold body by the three methods of escape. . . . And in order to explain and enforce this more fully, the World-honored One added the following stanzas :

Lust, or carnal desire, this is the mother,
'Ignorance,' this is the father,
The highest point of knowledge, this is Buddha,
All the 'kleshas' these are the Rahats.
The five skandhas, these are the priests,
To commit the five unpardonable sins
Is to destroy these five
And yet not suffer pains of hell."

Christ's startling prediction that "the children will rise against their parents and cause them to be put to death" bears an obvious likeness to these Buddhistic passages and will, on the supposition of an historical connexion between both religions, find, if considered in the light of the above quotation, a natural explanation.

THE DOCTRINE OF NON-RESISTANCE.

In pushing their doctrine of kindness and love of enemies to the utmost extreme, both Buddha and Christ seem to have had but little regard for the ethics of struggle. We purposely say "seem," for the doctrine of non-resistance is one of many paradoxes which admit of a perfectly satisfactory explanation; it has been interpreted by orthodox Christian theologians and also by Buddhists to mean that a man's disposition of heart must be such that he does not defend his right because it is *his*, but because it is *right*; that selfishness and personal vanity must not be our motives of action; and that a man must be willing to give up, if need be, not only what is taken from him, but other things in addition. Thus we are told by Christian exegetists, that Christ does not demand of us to give up the mantle to him who robs us of our coat, for Christ himself defended his right when unjustly beaten. Christ himself carried on a bitter warfare against those whom he called hypocrites, and generations of vipers. He showed the belligerent spirit of his zeal when he cast out those who bartered in the temple and held pigeons for sale, which act was probably an emphatic protest against bloody sacrifices, so extremely offensive to the Essene brotherhood. And Buddha, too, with all his gentleness, was himself a powerful, although always kind-hearted, controversialist; and his disciples are frequently compared to warriors who with spiritual weapons had unflaggingly and zealously to struggle for the truth.

THE SANGHA AND THE CHURCH.

There are also striking resemblances in the development of the Sangha, or Buddhist brotherhood, and the Church. Universality is a marked feature of both religions. Thus Buddhism, as well as Christianity, is possessed of a missionary spirit; anxious to let everybody partake of the blessing of their religion, they sent out apostles to all known countries of the earth. Councils were held to settle disputes as to the right doctrine. A sacred literature originated first of the Master's sayings, with incidental mentionings of

the occasions on which they were uttered; and later hagiographers undertook to tell the whole story of his life. There is an increasing tendency perceptible in the development of both Buddhistic and Christian thought, of more and more exaggerating the marvellous and of adding legendary elements. The sober spirit of Western civilisation, however, kept these tendencies in check by rejecting the apocryphal books, which also bear in several of their narratives a striking resemblance to Buddhistic tales.

There were monks in Buddhism long before Christianity existed; and Buddhist monks wear rough garments, live under the same, or almost the same, restrictions, have tonsures, and employ rosaries. They live as hermits or in cloisters, and the clergy of Tibet possess a hierarchy with institutions which are quite analogous to that of the Roman Catholic Church. They have processions, they baptise,[1] they sprinkle with holy water, and use the confessional.

There are analogies even of sects and heresies. The Doketistic heresy believed that Christ, because he was God, could have suffered no pain; his whole being was uncontaminated with material existence, and his body was mere appearance, a sham—hence the name of the sect from *δοκεῖν*, to seem. This view is represented in the apocryphal "Gospel according to St. Peter," in which we read (verse 10): "And they brought two malefactors and crucified the Lord between them; but he kept silence, as *feeling* no pain." Doketism is also one of the Buddhist heresies, as may be learned from a passage quoted from the *Fo-pan-ni-pan-king*, an expanded rendering of the *Parinirvâna-Sutra*, translated into Chinese by Dharmaraksha (*Sacred Books of the East*, Vol. XIX, p. 365, et seqq). The Tathâgata says to Chunda, the smith:

"To those who as yet have no knowledge of the nature of Buddha, to these the body of Tathâgata seems capable of suffering, liable to want (but to others it is not

[1] It is difficult to say whether or not baptism was established among the early Buddhists; if so, it is probable that the ceremony is older than Buddhism. We find bathing in the Ganges mentioned as a religious rite in Ashvagosha's *Life of Buddha*, verses 164–165. But no further explanation is given concerning it. Was it an ablution, or did it symbolise the crossing of the stream of samsâra? It is remarkable that St. Paul (I. Cor. iv, 1–4) says that the crossing of the Red Sea was the baptism of the children of Israel.

so); at the time when Bodhisattva received the offering of food and drink (he was supposed to have eaten the food). . . . so now having received your offering, he will preach the law. But still, as in the former case he ate not, so neither does he eat now."—Transl. by Samuel Beal, *l. c.*, p. 367.

There are two incidents which link Buddhism and Christianity together, in a quite peculiar way. On the one hand, Buddha has been received among the saints under the name of St. Josaphat,[1] so that in this respect the followers of Buddha must appear to Christians as a kind of Christian sect, however incomplete their dogmatic Christianity may be. On the other hand, Buddha prophesied that the next Buddha after him would be Maitrêya, the Buddha of kindness, and without doing any violence to Buddha's words, this prophecy may be said to be fulfilled in Jesus of Nazareth. Thus the Christians may be said to be Buddhists that worship Maitrêya under the name of Christ.

THE MAIN DIFFERENCE.

The similarities of Christianity and Buddhism are the more remarkable as among the dissimilarities there is one which exhibits an almost irreconcilable contrast. All those members of the various Christian denominations who call themselves its orthodox representatives, regard the belief in a personal God (an Îshvara) as the foundation of their religious faith. No wonder that they characterise Buddha's religion as atheism, denouncing it as unsatisfactory, or even nihilistic, and vigorously repudiate any kinship which might be supposed to obtain between both creeds.

The God-idea, representing the ultimate authority of conduct, is so fundamental in Christianity that Christians cannot think of any atheistic religion; they actually identify religion with belief in

[1] Josaphat is a corruption of Bodhisattva. For a detailed account of the Barlaam and Josaphat literature see Rhys Davids's *Buddhist Birth Stories*, pp. xxxvi, et seq. Rhys Davids says on p. xli: "It was Prof. Max Müller, who has done so much to infuse the glow of life into the dry bones of Oriental scholarship, who first pointed out the strange fact—almost incredible, were it not for the completeness of the proof—that Gotama, the Buddha, under the name of St. Josaphat, is now officially recognised and worshipped throughout the whole of Catholic Christendom as a Christian saint!"

God; and, indeed, we confess that it is remarkable how Buddhists can dispense at all with the God-idea.

We grant that no religion can exist without a belief in the existence of an ultimate authority of conduct; but in this sense Buddhism, too, teaches a belief in God. The Abhidharma, or Buddhist philosophy, distinctly rejects the idea of a creation by an Îshvara, i. e., a personal Creator; but it recognises that all deeds, be they good or evil, will bear fruit according to their nature, and they teach that this law, which is ultimately identical with the law of cause and effect, is an irreversible reality; that there are no exceptions or deviations from it. Thus, law takes to some extent the place of the God-idea, and Buddhists gain a personal attitude to it, similarly as Christians do when speaking of God, in quite a peculiar way. The doctrine of the Trikâya, or the three bodies, teaches that Buddha has three personalities; the first one is the Dharma-Kâya, or the body of the law: it corresponds to the Holy Ghost in the Christian dogmatology. The second personality is the Nirmâna-Kâya, or the body of transformations; it is transient in its various forms, and its most important and latest appearance has been Gautama Siddhârtha. This corresponds to the second person of the Christian Trinity, to God the Son, or Christ. But there is this difference: that the Nirmâna Kâya appeared before Gautama Siddhârtha in many other incarnations and will reappear in this and other worlds again; for every one who has attained to enlightenment and reached the ideal of perfection is a Tathâgata, a Buddha, a preacher of moral truth. It is in agreement with this conception that Philo speaks of Moses as a former incarnation of the Logos. The third personality of Buddha is called Sambhôga-Kâya, or the body of bliss. It is the Christian idea of God the Father. Buddha in his capacity as Sambhôga-Kâya is described as eternal, omnipresent, and omnipotent. He is the life of all that lives and the reality of all that exists. Thus he is the All in All, in whom we live and move and have our being.

Buddhistic atheism, apparently, is not wholly unlike Christian theism.

Christianity possesses in the idea, and, indeed, in the very word

Fig. 1.

Fig. 2.

Fig. 3.

"God," representing the authority of moral conduct in a most forcible manner, a symbol of invaluable importance; it is an advantage which has contributed not a little to make Christianity so powerful and popular, so impressive and effective as it has proved itself to be. In this little word "God," much has been condensed, and it contains an unfathomable depth of religious comfort.

No serious thinker who has ever grappled with the problem of the God-idea can have any doubt that the conception of God as an individual being is a mere allegory symbolising a great truth which it is difficult to explain to untrained minds in purely scientific terms. There is a disadvantage and there is also an advantage in mythological terms. Let us here as everywhere learn from various methods of presenting a truth. Let us prove all and hold fast that which is good.

BUDDHISTIC ART.

The spirit of Buddhism also exhibits a palpable affinity with Christian conceptions in its art productions, which, we have every reason to believe, originated uninfluenced by either the technique or the taste of the Western civilisation. The difference between Western and Eastern taste is as strongly marked in religious art as in the other walks of life. Nevertheless, there is an unmistakable coincidence of aspiration, which will strike any one who visits the Buddhistic departments of the Musée Guimet at Paris, or glances over the *Illustrated Guide* of its collections. We reproduce here a few pictures which seem to us especially instructive, because they express sentiments which are not foreign to the student of Christian art.

1. Mi-rô-Kou, or Maitrêya, the Buddha to come, of gilded wood (Sixteenth Century), seated upon a lotus in an attitude as if ready to rise and proclaim to the world the Gospel of the Good Law. The halo round his head and the divinely glorious attitude of his whole person remind us of Roman Catholic conceptions of Christ, such as can be found in abundance in all Catholic countries, especially in Southern Europe and in the Spanish colonies of America.

2. Amida (Buddha Amitâbha), also of gilded wood (Fifteenth

Century), stands upon the lotus in the attitude of a teacher. In contrast to the statue of Mi-rô-Kou it emphasises the human in Buddha and reminds us of the Protestant conception of Christ, which found its noblest representation in Thorwaldsen's famous statue.

3. Sam-bô, or the Buddhistic trinity, again representing Roman Catholic taste, shows the three jewels, the Buddha, the Dharma, and the Sangha. The Dharma (in one sense the Christian logos, in another the Holy Ghost) being most appropriately represented by written words, nor is it impossible that its higher position may indicate a certain superiority over the Buddha and the Sangha. For the Buddha is the incarnation and the Sangha the continued proclamation of the Dharma.

4. Kouan-yin, a peculiar conception of Buddha (made of porcelain), represents Buddha in one of his female incarnations as the goddess of charity and motherly love. The resemblance to Roman Catholic representations of Mary, the mother of Christ, is obvious, and the coincidence loses none of its force when we consider that the mythological conception of Kouan-yin is radically different from that of Mary. Buddha is conceived not as the object of motherly love, not as the infant, but as Love itself. The statues on both sides of the chair are Hoang-tchen-saï, the disciple of Kouan-yin, and Loung-nou, the servant of Kouan-yin; the former in an attitude of worship, the latter holding in his hands a luminous pearl. The necklace of Kouan-yin contains an ornament in the shape of a cross of the Renaissance.

5. Kouan-on, the Buddha of Charity, of gilt wood (Twelfth Century), an art production of the Tendai sect, exhibits what appears to us a transition to the conception of Buddha in the form of Kouan-yin. Buddha's attitude and the grace of his appearance is almost womanly, and might serve as a statue of the Virgin.

6. The Devil as a Buddhistic monk, carved wood of the Seventeenth Century, finds many parallel productions on the pinnacles of Gothic cathedrals. There is little probability that the Japanese artist who, with great ingenuity and humor, sculptured this admirable statue, ever heard of Rabelais, whose verse from Book IV,

Fig. 4.

Fig. 5.

Fig. 6.

chapter xxiv, has become an English proverb, which, according to Bartlett's *Familiar Quotations*, page 772, reads as follows:

"The Devil was sick, the Devil a monk would be:
The Devil was well, the devil a monk was he."

There is not only an obvious similarity in the religious ideas and objects of devotion, but even in religious satire, which cannot be explained by imitation, but must have originated independently in Buddhism as in Christianity.

THE CONNEXIONS BETWEEN THE EAST AND WEST.

The question whether Christianity and Buddhism have a common origin is perhaps less important than it appears, yet there attaches to it a peculiar interest because there is a numerically very strong section of Christians who would not allow that the noble ethical maxims of Jesus of Nazareth could have developed according to the laws of nature in the normal progress of evolution. There is certainly very little probability of a borrowing on the part of Buddhism as it is in all its essential features considerably older than Christianity. Buddha lived in the fifth century before Christ. The Buddhistic canon was settled at the time of the second council which took place about 250 B.C., and Ashoka's rock inscriptions which contain the gist of Buddha's doctrine and testify to its established existence date from the same period. This excludes at once the supposition that Buddhism is indebted to Christianity for its lofty morality and the purity of its ideals.

We must add that it remains not impossible (although not probable) that Buddhism, as it developed in its later phases in the North, has received from Christianity some modes of worship for which there would have been no place in the older Buddhism. Thus Prof. Samuel Beal believes that Christian ideas and forms of worship must have been imported into Northern India as early as 50 A.D. He considers it as highly probable that King Gondoforus of the Legenda Aurea is identical with Gondophares, the founder of the Scythian dynasty in Seistan Vandahâr and Sindh, coins of whose reign are mentioned by General Cunningham. (*Arch. Survey of*

Ind., II, p. 59.) Professor Beal trusts that the old legend of St. Thomas's visit to India is confirmed; he does not consider, however, the possibility, which is not improbable, that the legend of St. Thomas may, like the St. Josaphat story, be a Christianised Buddhist legend. We waive the question and confine ourselves to stating that the evidences which Professor Beal introduces to prove the possibility of a Christian influence upon later Buddhism go still farther to establish the possibility of a Buddhistic influence upon Judea before the time of Christ's appearance. Professor Beal says (p. 133–134):

"The Parthian prince, Pacorus, was, as Josephus tells us, in possession of Syria and at Jerusalem. . . . Then again, the marriage of Chandragupta with a daughter of Seleucus, and the apparent knowledge possessed by the grandson of Chandragupta, the great Asoka, with the Greek King Antiochus, and his embassy to four other Greek kings,—all this shows that there must have been some connexion between India and the Western world, from the time of the establishment of Greek influence in the valley of the Oxus."

There were plenty of channels through which Buddhist doctrines could reach Palestine.

Speaking of the similarity between the Buddhist story of the wise judge and the account of Solomon's judgment, as told in the Book of Kings, Prof. Rhys Davids mentions the commercial relations that obtained in those early days between Judea and India. He says (*Buddhist Birth Stories*, pp. xlvi–xlvii):

"The land of Ophir was probably in India. The Hebrew names of the apes and peacocks said to have been brought thence by Solomon's coasting-vessels are merely corruptions of Indian names. . . . But any intercourse between Solomon's servants and the people of Ophir must, from the difference of language, have been of the most meagre extent; and we may safely conclude that it was not the means of the migration of our tale.

"Though the intercourse by sea was not continued after Solomon's time, gold of Ophir, ivory, jade, and Eastern gems still found their way to the West; and it would be an interesting task for an Assyrian or Hebrew scholar to trace the evidence of this ancient overland route in other ways."

In order to prove the possibility of an exchange of thought between India and Judea, it is not even necessary to fall back upon these old commercial relations which are difficult to trace, for we know for sure that since Alexander's time the connexions between

the East and the West in general, and especially between Buddhist countries and Judea, were quite intimate. Ashoka's rock inscriptions alone are sufficient to prove that official legations had been dispatched from India to the most important neighboring countries and to Western Asia for the sole purpose of making a strong propaganda for Buddha's religion and the Buddhistic principles of universal kindness and compassion for the suffering. The second edict mentions a legation to King Antiochus for mere humanitarian purposes. It reads as follows:

"Everywhere in the kingdom of the king Priyadarshin,[1] beloved of the gods, and (among those) who (are) his neighbors, as the Codas, the Pandyas, the prince of the Satiyas, the prince of the Karalas Tâmraparnî, the Yavanas[2] king Antiochus and (among the) others who (are) the vassal kings of Antiochus—everywhere the king Priyadarshin, beloved of the gods, founded two (kinds of) hospitals—hospitals for men and hospitals for animals. Wherever there were no healing herbs to be found, whether herbs fit for men or herbs fit for animals, to all such places and in all such places, he issued orders to have such herbs brought and planted. Also where there were no healing roots and fruits he issued orders to have (them) brought and planted. And along the roads he had trees planted and wells dug for the use of man and beast."

The thirteenth edict speaks directly of a missionary legation for spreading Buddha's religion. The first part of the inscription is mutilated. The German translator, Professor Bühler, says that from the few correctly read words of a version of the same edict preserved near Shâhbâzgarhî, and from the fragment of the Girnâr inscription, the thought of the missing lines can be restored. Having expressed remorse at the atrocities committed before his conversion in Kaliriga, the king states that it is his intention from now on to make no more conquests by the sword, but is determined to take from his free neighbors everything that can possibly be endured. He adds that even the wild tribes in the forest ought to be participants of this kindness, and concludes with the remark that he has no other desire than to treat all beings with indulgence, justice, and clemency. The part still extant reads:

[1] This is the customary appellation of Ashoka.

[2] The Yavanas are the Greeks.

"(The beloved of the gods wishes) . . . . for all creatures . . . . forbearance justice, and clemency! But the following is judged of the greatest consequence by the beloved of the gods, namely, conquest by the law (Dhaṃmavijaye). This conquest is made by the beloved of the gods as well here (in his own kingdom) as among all his neighbors. For at a distance of six hundred Yojanas lives the (king) of the Yavanas (Greeks), called Aṃtiyoga (Antiochus) his neighbor, and beyond him are four, 4, kings, one named Tulamaya (Ptolemæus), one called Aikyashudala (Alexander); (further), towards the South the Codas (Colas) and the Paṃdiyas (Pândyas) as far as Tambapaṃni (Ceylon), likewise the Hida king among the Vishas (Bais), and Vajis (Vrijis), the Yavanas (the Greeks) and the Kambojas (Kâbulîs), among the Nâbha tribes of Nabhaka, among the Bhojas and Pitinikas, among Andhras and Piladas (Puliadas)—everywhere is the doctrine of the law of the beloved of the gods followed. Even those to whom the envoys of the beloved of the gods do not go, follow the law, as soon as they have heard the comments issued by the beloved of the gods according to the law, his sermon of the law, and they shall follow it in the time to come. The conquest which by this means is everywhere accomplished fills (me) with a feeling of joy. Firmly founded is (this) joy, the joy at the conquest by the law. But (this) joy is in sooth merely something slight. The beloved of the gods holds that only of worth which has reference to the Beyond. But this religious edict is written for the following purpose. To what purpose? That my sons and grandsons (to the end of time) shall deem no other kind of conquest desirable, that if a conquest by weapons should be absolutely necessary they should exercise mercy and clemency, and that they shall only regard conquest by the law as real conquest. Such a (conquest) brings salvation here to you. But all (its joy) is the joy of effort. This, too, brings salvation here and beyond."[1]

Thus there cannot be the slightest doubt that Buddhist missionaries were sent to Western Asia in the third century before the Christian era and must have made attempts to preach Buddhism.

Concerning the importation of Buddhist tales, Professor Rhys Davids says (p. xliii):

"We only know that at the end of the fourth, and still more in the third, century before Christ there was constant travelling to and fro between the Greek dominions in the East and the adjoining parts of India, which were then Buddhist, and that the birth stories were already popular among the Buddhists in Afghanistan, where the Greeks remained for a long time."

Shall we assume with Rhys Davids that a great number of Jataka tales, such as the legend of the Kisâ-Gotamî,[2] the story of the ass in

[1] Translated from the *Zeitsch. für Morgenl. Gesellschaft*, Vol. XIV, pp. 135, 136.

[2] See Jacob H. Thiessen, *Die Legende von Kisâ-Gotamî*, Breslau, 1880.

the lion's skin, the jackal and the crow, and other prototypes of the so-called Æsopean fables, found their way to Greece, there to reappear in Greek literature, while the main ideas of Buddha's religion remained utterly unknown in the West? No Western traveller, we are bid to believe, ever heard of them in the East, and no Eastern traveller ever mentioned them in the West. And yet we know that the Buddhists were burning with zeal for propagating their religion, and the Sangha sent out missionaries into all quarters of the world. It would be strange if Buddhist missionaries had gone to all neighboring countries except to Palestine, and that all kinds of Buddhist stories and wise saws were translated into other tongues, but not the essential doctrines of their sacred literature.

POSSIBLE BUDDHISTIC ORIGIN.

The probability that an influx of Buddhistic doctrines took place is very strong; nevertheless we do not press the theory that Christianity was influenced by Buddha's religion, but regard it as a mere hypothesis. Here is a proposition of how matters might have been:

It is certain that Buddhist missionaries, had they come to Palestine, would not have attacked the religion of the country, but would, in accordance with their traditional policy, have adapted themselves as much as possible to the current ideas of the people. They would have preached the gospel of Buddha, and would have tried to proclaim their message in the very terms of the Jewish creed. The soil was prepared for them by Isaiah and other prophets who objected to bloody sacrifices. It would be quite in accord with their methods pursued in other countries to adopt the Messiah idea, and to embody the Jewish notions into their faith. The Buddhist missionaries did not cling to Gautama Siddhârtha; they would always be as ready to preach the Buddha of the past as the Buddha to come. Since Buddha himself had proclaimed the coming of Maitrêya, the Buddha of Kindness, must it not have appeared possible to Buddhists living in Judæa and observing the religious earnestness of the Jews, that Maitrêya was to rise among the Jews? This would explain

not only the origin of the Essene movement, which otherwise appears very obscure, but also the change of the worldly idea of a Jewish Messiah into the conception of a spiritual saviour of the whole human race from sin. The first symptoms of this change are found already in the Jewish Apocrypha, especially the book of Esdras, in which "the Son of David" begins to be called "the Son of Man," an expression that was adopted by Jesus. The great mass of the Jews of the time of Jesus still expected a Messiah who would be like Judas Maccabæus, a warrior and a worldly king, a redeemer from foreign oppression, yet the Essenes and the disciples of John regarded the various dignities which tradition attributed to the Messiah, as mere similes. In their idea the Messiah would be an ascetic hermit and a wandering preacher, more like Buddha than like Herod, for his kingdom was not of this world; he was the Dharmarâja, the king of truth.

As the Brahman god, Brahma, continued to play an important part in the Buddhist mythology, so we ought to expect that Buddhist missionaries would not have attempted to deny the existence of Jehovah. Yet, knowing the sternness of Jewish monotheism, we can understand that the Jewish God could not take a place inferior to Buddha; and as Buddha on the other hand was superior to all gods, both God and Buddha could only be identified, so that Christ could say: "I and the Father are one."

Considering the fact that later Buddhism developed out of its own elements a cosmic authority of conduct which practically serves the same purpose as the Christian God-idea, we cannot regard it as strange that Buddhists who lived in Judea should have adapted the Jewish theism to the trikâya of their own faith. The result could only be a trinity conception such as taught by the church.[1] Now if a Buddhist brotherhood had settled in Judea, they would have recruited themselves from Jews, and we can fairly assume that they naturally would have set on foot a movement like

[1] The development of the Christian Trinity is still shrouded in darkness. We know from passages in the Apocryphal Gospels that the Holy Ghost was identified by some of the old Christians with the Logos; and some considered the Third Person of the Deity as a feminine presence and the Mother of Christ.

that of the Essenes and the first Christian society at Jerusalem with its communistic ideals, its martyr spirit, and its invincible faith in the kingdom of truth.

It is often assumed that if the priority of Buddhism were proved, it would imply that Christianity would have to be regarded as a deteriorisation of Buddhism; it would deprive Christianity of all claim to originality, beauty, and truth. We might on the same argument say that Anglo-Saxon is a degenerated form of Low German, or that the polar bear is a degenerated species of the grizzly bear, or even that civilised man is a deteriorated anthropoid. Christianity embodies in its world-conception the best thoughts of the past from all quarters of the globe. The Logos idea was derived from Neo-Platonism, the God-idea is a Jewish tradition, baptism an Essenian rite, the holy communion reminds us partly of a Dionysian cult, partly appears to be a substitution of bread offerings in the place of bloody sacrifices;[1] the love of enemies was preached in a similar paradoxical form five centuries before Christ in the far East. The idea of a world-Saviour is Buddhistic. In a word, none of the elements of Christianity is radically new; nevertheless, the whole in its peculiar combination is decidedly original and marks the beginning of an era which stands in strong contrast to all the ages past.

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[1] Justinus Martyr (Apol. I, 68), referring to a similar rite of distributing bread among the worshippers and handing them a chalice of water to drink that obtained among the Parsees, accuses the Devil of aping the Lord. While it is not impossible that the Parsees of Justinus's time had adopted some features of the Christian Sacrament, it is certain that the institution of the haoma-offering was an old established ceremony in Zarathustra's religion. It is of Aryan origin. Haoma is the Vedic *Sôma*, and the holy meat of Myazda, small pieces of which were eaten on little cakes called "draona," consecrated in the name of deceased persons, are the Vedic *hotrâ*. And it is said that he who drinks of the white haoma or Gao-kerena will on the day of resurrection become immortal. (See Darmstetter's *Introduction to the Zend Avesta in S. B. of E.*, IV, p. lxix and also the note on p. 56.) Zarathustra calls "the sacred cup and the haoma the best weapons to strike and repel the evil doer Angra Mainya." (*Ibid.* p. 206.)

It is possible that Buddhistic influence replaced the intoxicating haoma by water, while the Greek to whom wine was a symbol of holy enthusiasm again changed the water into wine.

The original meaning of breaking the bread must have been that in the new dispensation a loaf is sacrificed on the altar and not an animal. The oldest account of the Lord's last supper is found in Cor. xi, 23 et seq., and it is noteworthy that St. Paul neither mentions the Paschal Lamb nor the wine.

PARALLELISM WITH LÂO-TSZE.

Although it is true that the coincidences between Buddhism and Christianity are remarkable and numerous, and that their differences are easily accounted for, we must nevertheless concede that both religions may have originated independently. We possess the strange case of a similar parallelism to both Buddhism and Christianity in Lâo-tsze's philosophy which can hardly be suspected of being borrowed from either. We quote a few passages from his *Tâo Teh King*, which was written about six hundred years before Christ, and almost one hundred years before Buddha. The Chinese word *tâo* bears a peculiar likeness to the Greek term *logos*. It means "word," "reason," and "path or way" at the same time. The first sentence of the *Tâo Teh King* reminds us of the first verse of the fourth Gospel in the New Testament, and many other passages breathe the spirit of Christian ethics. We read in the *Tâo Teh King*:

"The *Tâo* (word, reason, path, or briefly logos) that can be *tâoed* (reasoned, argued with, walked on, or spoken) is not the Eternal Tâo. The name which can be named is not the Eternal Name. (Sec. 1.)

"Tâo produced unity; unity produced duality; duality produced trinity; and trinity produced all things. (Sec. 42.)

"Lay hold on the great form (of Tâo), and the whole world will go to you.

"Tâo, in its passing out of the mouth, is weak and tasteless. If you look at it there is nothing to fill the eye. If you listen to it, there is nothing to fill the ear. But if you use it, it is inexhaustible. (Sec. 35.)

"The great *Tâo* is all-pervading. It can be on the right hand and also at the same time on the left. All things wait upon it for life, and it refuses none. When its meritorious work is done, it takes not the name of merit. In love it nourishes all things, and does not lord over them. It is ever free from ambitious desires. It may be named with the smallest. All things return home to it, and it does not lord over them. It may be named with the greatest.

"This is how the wise man, to the last, does not make himself great, and therefore he is able to achieve greatness. (Sec. 34.)

"Recompense injury with goodness. (Sec. 63.)

"The *Tâo* of Heaven may be compared to the extending of a bow. It lowers that which is high, and it raises that which is low. (Sec. 77.)

"He who knows others is wise. He who knows himself is enlightened.

"He who conquers others is strong. He who conquers himself is mighty.

"He who knows when he has enough is rich. (Sec. 33.)

"The good I would meet with goodness. The not-good I would also meet with goodness. Virtue is good. The faithful I would meet with faith. The not-faithful I would also meet with faith. Virtue is faithful. (Sec. 49.)

"He that humbles (himself) shall be preserved entire. He that bends (himself) shall be straightened. He that is low shall be filled. He that is worn out shall be renewed. He that is diminished shall succeed. He that is increased shall be misled. Therefore the sage embraces Unity, and is a pattern for all the world. He is not self-displaying, and, therefore, he shines. He is not self-approving, and, therefore, he is distinguished. He is not self-praising, and, therefore, he has merit. He is not self-exalting, and, therefore, he stands high." (Sec. 22.)

The Buddhistic-Christian spirit of Lâo-tsze's philosophy is so striking that the suggestion has been made to trace its origin to the same sources in India from which Buddhism has sprung. But considering the fact that Buddha is almost a hundred years younger than Lâo-tsze this assumption is barely possible, not probable. And must we not grant that the Christian ethics if true may naturally develop in any country and in any age?

NOTHING AND THE ALL.

There are many remarkable agreements of all kinds which are due, not to a borrowing, but to a similarity of the circumstances which give rise to an idea or an event. So an Indian chief, who cannot be suspected of ever having read Cæsar, replied to the invitation of the President of the United States in almost the same terms as Ariovistus.

Among many peculiar coincidences of Buddhistic conceptions with ideas of thinkers who never came in contact with Buddhistic traditions, let me mention only one. Passerat, a late Latin poet of the sixteenth century, a native of France, (as quoted by Charles F. Neumann in his *Catechism of the Shamans*, London, Oriental Transl. Fund, 1831) says in one of his verses:

"Nihil interitus et originis expers
Immortale Nihil, Nihil omni parte beatum.
Felix cui Nihil est."

This expression praising the happiness of him who has attained the Nothing which knows the beginning and end of all things, the immortal nothing, which is blessed throughout, would be natural in the mouth of a Buddhist, to whom the word conveys different associations than to us, but it is startling when pronounced by a poet who in his surroundings had no chance of hearing the praises of Nirvâna.

A REACTION AGAINST DUALISM.

The similarity between Christianity and Buddhism must be due to a similarity of conditions. And such a similarity of conditions existed; yet here again we have good reason to believe that these very conditions were imported from India. If Buddhism was not directly transplanted to Palestine, it still remains quite probable that the seeds at least from which it sprang were sown by Buddhists in the soil of Galilee.

The main basis of all the agreements between Buddhism and Christianity lies in their similar attitude towards a dualistic and pessimistic world-conception. It is sufficiently known how Buddhism developed from the Sâmkhya system, and there can be no question that Christianity presupposes the prevalence of similar ideas in the minds of the people among whom Jesus Christ lived and taught—not among the learned only but among the multitudes.

The Essenes formed a faction among the Jews standing in opposition to both the conservative and old orthodox Pharisees and the liberal and Hellenised Sadducees. All that is known about the Essenes reminds us of Buddhistic monk fraternities and Hindu ascetics. There was a similar movement in those days among the learned Jews of Alexandria, which developed into Neo-Platonism, represented mainly by Philo (who died 54 A. D.), Plotinus (205–270), and Porphyry (232–304).

Lassen traces Neo-Platonism and Gnosticism back to India, and Professor Weber suggests the derivation of the Græco-Christian Logos-idea from the Indian "Vâch" (i. e., voice, speech, word), calling attention to the fact that the divine "Vâch," which in Sanskrit is a feminine noun, appears in numerous passages as the consort of Prajâpati, the Creator, in union with whom and by whom he

accomplished his creation. Professor Garbe, in his remarkable article in *The Monist* (Vol. IV, No. 2), not only confirms these suppositions, but, following Leopold von Schroeder's suggestion, offers abundant evidence for the derivation of Pythagoric views from the same source, India, which thus seems to have been the cradle of all our philosophies. We consider the hypothesis of a historical connexion between Buddhism and Christianity as very probable; yet at the same time must say that whether it is true or not is of little consequence. There are enough parallels concerning which we can be sure that they are not due to a borrowing, and such parallelism alone as obtains between Lâo-tsze on the one hand and Buddhism and Christianity on the other hand, is sufficient to prove that the evolution of both religions may have taken place independently, according to a natural law.

Whether or not the Sâmkhya philosophy and its offshoot, Buddhism, were transplanted from India to the Western world, we find that the Hindus not less than the Græco-Judæan thinkers arrived at a crisis in their religio-philosophical evolution in which they perceived the difference between soul and body, mind and matter, spirituality and sense-appearing reality. This difference once understood, leads easily to wrong conclusions. Before a monistic solution of the problem is sought, the dualistic view naturally presents itself first to a superficial consideration as the simpler conception. It was quite correct to regard mind as the all-important element of man's life, but it was a mistake, although it seemed quite plausible by way of contrast, to look upon matter as the source of all evil. Thus the Sâmkhya philosophers, and, in agreement with them, the Neo-Platonists, believe in the existence of two realities, matter and soul (or rather souls, for they assume a boundless plurality of individual souls), while material existence is looked upon as the cause of all misery and pain. The body is said to be that which hampers the mind and imprisons the soul as in a dungeon, while spiritual existence, or that which produces the illumination of consciousness in man, is praised as infinite perfection and divine bliss. Thus the world is cut in twain, and the logical consequence of this dualism is pessimism. This world of ours, the world of bodily existence in

which, as they say, the soul is imprisoned, is a domain of suffering (note here also the parallelism with Plato), and the highest aim of human exertion must be salvation from the bondage of matter. Hence asceticism and self-mortification. The death of the body was longed for because promising the liberation of the soul. Now Buddha, as well as Christ, rejected pessimistic ethics; yet it is noteworthy that they did not denounce it as altogether wrong; they only forbade the enforcement of it among their disciples, and regarded it as a lower and insufficient method of attaining salvation, or rather as a phase through which he who seeks deliverance must pass. They themselves had passed through it and rejected it. Therefore they suffered it still, but boldly disavowed its principles in their own conduct.

Thus, in the dualism of both the Sâmkhya philosophy and the Essenic ethics, as also in Neo-Platonism, a great truth, the idea of the all-importance of mind, was linked to fatal errors, viz., the duality of mind and matter, the fiction of a purely spiritual empire, and the escape from the material world to the spirit-realm through the suppression and gradual mortification—mortification in the literal sense of the word, which means the reducing to a state of being dead—of all bodily existence.

Buddha and Christ were confronted by the same dualism and facing the same problem of salvation, solved the problem in the same way. Both abandoned the traditional dualism and its pessimistic applications. After having tried world-flight, fasts, and self-mortification, they gave up all further attempts at uplifting the mind by a vain struggle against the body. Yet neither Buddha nor Christ surrendered the truth contained in the dualism of their predecessors. They recognised that the purpose of life lay not in the sphere of material reality, but in the realm of mind; that the life is more than meat, and that all worldly goods serve only as means for our spiritual needs. As to the problem of evil, they surrendered the dualistic method of deliverance through asceticism for a monistic ethics of righteousness. Both Buddha and Christ found that the source of sin lay deeper than in the complications of mind with matter; that material existence is innocent of wrong-doing, and that

mind alone makes or mars the world. Lust, vanity, and hatred do not reside in the objects of our senses, but in our hearts. A wrong-directed mind is the source of sin, and a purification of the mind from its sinful desires is the sole condition of salvation. Accordingly, both Buddha and Christ abandoned world-flight and self-mortification; they both returned to the world and gave offence to those who were still under the sway of a dualistic morality; they lived among the people, preaching the new way of salvation and the attainment of the kingdom of heaven that is within us.

In saying that Buddha and Christ abandoned the ethics of dualism and proposed a new system of morality that might properly be designated as monistic, we do not maintain that either Buddha or Christ taught a monistic philosophy. Neither Buddha nor Christ were philosophers, although the former can be called a philosopher with more propriety than the latter. Both were religious leaders; Christ more so than Buddha. Buddhism and Christianity are religions and not philosophies; yet from their first appearance when their founders began to preach the new doctrine, they ushered in an era of monistic thought. By discarding pessimistic principles and proposing a melioristic morality they led the way towards a monistic world-conception. The philosophy underlying their religious faith already shows a monistic trend.

As religions are slowly expanding and developing in the course of their evolution, so they cannot have originated without due preparation. Their growth is due to natural causes and takes place according to natural laws. St. Paul is generally considered as the founder of the Gentile Church; however, the existence of a Christian congregation in Rome to which he addresses the most important one of his epistles, is alone an undeniable evidence that he was one only among many missionaries of the new faith. Apollos, it is said in Acts xviii, 24, "taught diligently the things of the Lord, knowing only the baptism of John," and Paul coming to Ephesus, found "certain disciples who had not so much as heard whether there was a Holy Ghost" and were baptised unto John's baptism.[1] This is

[1]Acts xix, 1–2.

noteworthy. It proves that there were at that time, when Christian missionaries began to preach, Christian-like congregations who differed but slightly from those baptised in the name of Jesus Christ. It is not impossible that such communities of so-called "disciples" (which was also the name of the first Christians) were scattered even in the life-time of Christ over the whole Roman empire; in other words, the germs of Christianity existed before Paul organised them into Christian churches.

As the Gentile Church originated before Paul, so a pre-Christian Christianity must have begun to grow before Jesus. Apollonius of Tyana, p. 99, is an exponent of this spirit. He was in many respects similar to Jesus of Nazareth and the legends which his pious admirers told of his life bear so much resemblance to the Christian Gospels and Apocrypha that Christian fanatics have jealously destroyed the greatest part of them.[1] In a similar way Buddhism developed in India on parallel lines with Jainism. If Gautama Siddhârtha had not appeared, Jnyâtaputra, the founder of Jainism, might have taken his place. *Vice versa*, if Buddhism which had grown so much more powerful than Jainism, had not been rooted out in India, might not Jainism have been absorbed by it so as to disappear entirely? And if Jesus of Nazareth had not become the Christ of the Western world, might not Apollonius have played a similar part in history? We do not mean to say that Apollonius was near as grand or sympathetic a figure as Jesus, we only say that his character was of that type from which mankind would be inclined to select their Christs, their Buddhas, their Saviours. He was in many respects suitable to serve as a centre of religious crystallisation, and the sacred legends would have so moulded his personality as to make

[1]After his death Apollonius was worshipped with divine honors for a period of four centuries. A temple was raised to him at Tyana, which obtained from the Romans the immunities of a sacred city. His statue was placed among those of the gods, and his name was invoked as a being possessed of superhuman powers. The defenders of paganism, at the period of its decline, placed the life and miracles of Apollonius in rivalry with those of Christ; and some moderns have not hesitated to make the same comparison. There is no reason to suppose, however, that Philostratus entertained any idea of this sort in composing his life of Apollonius.—*Encl. Brit.*, Vol. II, p. 189.

of him an incarnation of the highest moral ideal of the age. In other words, if Jesus had not appeared, we might have substantially the same religion.

EVOLUTION IN RELIGION.

It is the habit of all religious devotees to look upon their religion as a fixed dogma. So many Buddhists imagine that true Buddhism consists in the teachings of Gautama Buddha, and Christians in the same way trust that the whole breadth and depth of Christianity was developed by Jesus Christ in his sermons, parables, and the example he set in his life. This is not so. Buddha and Christ were the founders, the one of Buddhism, the other of Christianity. It may be true that the most important features of both religions can be traced to their personal authority, but there are many phases in the development of mankind (so, for instance, the abolition of slavery) which were not thought of at the time either of Buddha or Christ. Neither Buddha nor Christ gave us in their sermons a rule for dealing with the slave problem; yet we cannot say that their spirit of brotherly love was not a most important factor in its final solution. The development of Christianity was not completed with Christ's crucifixion, nor was Buddhism completed at Buddha's death; both continued to grow and to work out the problems of life in the spirit in which their founders had set the example. They are still growing and we must be careful not to judge them according to the past alone, but consider the life that is in them now and also their future potentialities.

Buddhism and Christianity have not only developed the germs which were sown by their founders, but have also assimilated the religious experiences of other nations.

The original Christianity of the church at Jerusalem, changed when it spread over the Roman empire; and it changed again when introduced among the Teutonic races of the North. Our present Christianity, for instance, contains more of the Teutonic race ethics than many of us, especially our clergy, are aware of and is very different, indeed, from the original Christianity of the communistic church at Jerusalem. Buddhism, too, has undergone changes. The

Hinayâna of southern Buddhism is marked by a certain negativism, while the Mahâyâna of northern Buddhism makes the positive aspect of the Dharma and of Nirvâna more prominent. Among the Tibetans this tendency of the Mahâyâna doctrines has developed a fantastic mythology and the ecclesiastical institutions of Lamaism, while the more sober Japanese appear to be quite scholarly and freer from superstition.

THE SUPERNATURAL IN THE NATURAL.

Taking it for granted that Buddhism and Christianity have not influenced each other and are of independent growth, their similarities will have to be regarded as the more remarkable, since they will then all the more render a special revelation theory redundant. They are a most powerful argument for a sweeping latitudinarianism, and will, if properly understood, crush the last remnant of sectarianism in Christianity. Shall we say that the injunctions: "Recompense injury with goodness," and "hatred does not cease by hatred; hatred ceases by love," have naturally developed the one in China and the other in India, while the same lofty moral thought could be attained in Judæa only through a supernatural revelation? No, the supernatural will develop everywhere according to the eternal laws of nature.

The sky, in old folklore tales, is conceived as a glassy bowl that covers the earth, and the Indians imagine themselves favored by Manitou, the Great Spirit, who located them under the very top of the heavens. Let us not imitate their narrow-mindedness by believing that we alone are blessed with the zenith of a religious revelation. God spoke not through Moses alone nor through Jesus alone. God has left no one without a witness, and he speaks to every one of his children in the same way, if they but open their minds to perceive his revelation. The Zenith is over the heads of every one who raises his eyes to look up to it, and there is no part of nature but it contains the supernatural. The natural is supernatural all through. Thus we need not wonder that the foundation-stones of Buddhism and Christianity are the same; they are of a universal nature, and we are justified in assuming that if there are rational

beings on other planets, they, too, will develop in the course of their religious evolution a religion of deliverance from evil by walking in the noble path of righteousness. Among them, too, a saviour will rise to bid them renounce their self and all selfishness, and to take refuge from the evils of existence in an all-embracing love.

We deny the existence of the supernatural in a dualistic sense; but suppose we call such higher features of nature as appear in man's ethical aspirations hyperphysical or supernatural because they rise above the lower and purely physical elements of the universe, we must confess that the supernatural lies hidden in the natural and is destined to grow from it according to the cosmic law of existence. All living creatures face the same universe and are confronted with the same problems of life; must we not, in the end, all come to the same conclusions, and, however different may be the modes of presenting them, adopt the same rules of conduct? In the light of a unitary world-conception the agreement between various religions ceases to be startling and finds, even on the assumption that they have developed quite independently, its natural explanation.

HINÂYÂNA, MAHÂYÂNA, MAHÂSÊTU.

Recognising a continued evolution in the religions of mankind, we do not look upon later Buddhism with the same contempt as is customary among many Buddhist scholars. It is true that the old Buddhism of the Hinayâna school has preserved the old traditions more faithfully and is more philosophical than religious, while the Mahâyâna school which now obtains in the North, especially in Thibet, in China, and in Japan, is more religious than philosophical, almost hiding Buddha's doctrines under an exuberant outgrowth of fantastical superstitions. We must, nevertheless, recognise in this progress from the Hinayâna, or the small vehicle of salvation, to the Mahâyâna, or large vehicle of salvation, an advance in the right direction. Buddha had taught his disciples the path of salvation and had inculcated an unbounded love for all mankind, including one's enemies. It was quite natural that his followers were anxious to extend the blessings of salvation to all mankind. The

Hinâyâna is a religion for the thinker, for the wise, for the strong; it is not a gospel to those who are poor in spirit, who are ignorant, who are weak; and yet it was the principle of the Master's all-comprehensive compassion to save *all* the world! What was more natural to a true-hearted Buddhist than to make the blessing of Buddha's religion accessible to the multitudes? The small canoe of the Hinâyâna sufficed for every one only to save himself and no one else. But what did a Buddhist care for his own salvation? A true Buddhist had ceased to be troubled about himself. He wanted to save others. Thus the general idea of a Mahâyâna, a large conveyance of salvation, of a great ship to cross the stream of worldliness, of sin, and suffering, was a logical consequence of Buddha's doctrine, even though the methods with which this idea was realised may in many respects be regarded as a failure. Yet in judging the Mahâyâna system and its fantastical offshoots, we must consider the mental state of those nations for whom it was adapted, and it may be that a purer religion would have failed utterly where cruder allegories of what appears to us as childish superstitions exercised a beneficent influence. The Mahâyâna has changed the savage hordes of central Asia, from whom proceeded the most barbarous invaders, dreaded by all their neighbors, into a most kind-hearted people, with a sacred passion for universal benevolence and charity.

Considering the development from a Hinâyâna conception to a Mahâyâna practice as an advance, we can still less regard Christianity, even if its derivation from Buddhism were certain, as a deterioration. Buddhism, viz., the original Buddhism of Buddha, is more philosophical and more abstract than Christianity, but Christianity is more religious. Buddhism, viz., again, the original Buddhism of Buddha, is free from all mythological elements while Christianity employs a number of allegorical expressions which are both appropriate and forcible. There is the dogma of the personality of God, of the Sonship of Christ, of the quickening influence of the Holy Ghost, of the personality of Satan, of angels and devils, of heaven and hell; and even to-day the belief in the literal meaning of all these religious symbols is counted among many Christians as the test of orthodoxy. What does it matter that during the develop-

ment of the Church they have crystallised into temporarily fixed dogmas, which sometimes threatened to ossify the properly religious spirit of Christianity? The symbolism of Christianity is after all its dross only; its essence is that ethical spirit which it has in common with Buddhism. The Christian dogmatology, if properly recognised in its symbolical nature, is most beautiful, expressive, and true, but if taken in its literal meaning commits us to irrational absurdities. He who believes in the letter of a myth, or a dogma, or a religious allegory, is a pagan, and Christian paganism is not less absurd than Lamaistic or any other paganism. Nevertheless, he who believes in a myth that contains in the garb of a parable a religious truth, and accordingly regulates his moral conduct, is better off than he who is void of any faith. The truth hidden in the myth teaches him and serves him as a guide; it comforts him in affliction, strengthens him in temptation, and shows him in an allegorical reflexion the bliss that rests upon righteousness. The Hinâyâna, in its abstractness, it appears to us, is indeed insufficient for the masses of mankind, and had to change into a Mahâyâna system before it could conquer almost half the world. Christianity, however, is more perfect even than the Mahâyâna of Buddhism, as a vehicle of salvation for the masses of mankind. While the schools of Buddhism may be compared to ships that cross the stream, Christianity is like a large and solid bridge. Christianity is a Mahâsêtu. A child may walk over in perfect safety. Christianity is, as St. Augustine says, like a water in which a lamb can wade while an elephant must swim. It is difficult to explain spiritual truths to an untrained mind, for even philosophers find it difficult to understand why we must free our souls from the thought of self and overcome all vanity, lust, hatred, and ill-will. But a young Christian heart finds it very natural. Without going through all the painful experiences which lead to the abandonment of selfishness, a Christian child having received Jesus and his all-comprehensive love into his heart is, on the start of his life, placed in the right moral attitude towards the world. Christianity has been especially successful in teaching surrender of self without at the same time disturbing the egotism so strongly developed in Western nations. In a word, Christianity extends the bliss of

righteousness not only to the ignorant who do not understand the problem of life of which Christian ethics present a practical solution, but also to those whose eyes remain still covered with the veil of Mâyâ; yea, even to the little children who have never as yet heard of sin or the cause of sin. There is no more characteristic saying of Christ's than his words: "Suffer little children to come unto me."

No fault can be found either with Christianity or the symbols of Christianity, but blame rests with those who claim that the Christian symbols do not merely contain the truth in the language of parables, but that they are the truth itself, the absolute truth which must be accepted in blind faith whatever be the verdict of a rational inquiry or scientific criticism. The Christian whose faith consists in obedience to the spirit of Christ's ethics can shake hands with the Buddhist and say, we are brethren; our religions solve the problems of life in a similar spirit, although we differ in our modes of expression. The Christian, however, whose faith is a belief in the letter of his dogmas may regard the Buddhist, be he ever so highly educated, as a pagan and Buddha as a false prophet or even "an imposter."[1] The latter kind of Christianity is still regarded as orthodox, but the time will come and is near at hand when its flagrant paganism will be recognised by the very authorities of the Church. The former kind of Christianity will be established as the only true Christianity, and the old narrow orthodoxy of bigotry and blind faith will be supplanted by the new broad orthodoxy of scientific truth.

Christianity, at present the second largest religion in the world, can very well become the universal religion of mankind, but there is one condition which must be fulfilled before it can gain the victory. It must discard all paganism; it must become conscious of the symbolical element of its symbols; it must with impartial justice recognise the truth wherever it be; it must be courageous enough to acknowledge its own errors of former misinterpretations, and appreciate the good that is contained in other religions; in a

[1] See Spence Hardy in his *Legends and Theories of the Buddhists*, p. 207.

word, it must become a cosmic religion—truly catholic and orthodox.

What is more orthodox than that which with methodical exactness has been proved to be true, and what is more catholic than science? We must learn to understand that science is a religious revelation.

This, in essence, is the lesson which a comparison of Buddhism with Christianity can teach us: Above any Hinâyâna, Mahâyâna and Mahâsêtu is the Religion of Truth, and the truth reveals itself everywhere, to every one who has the religious spirit to seek it, and dares to find it.

EDITOR.

ON THE NATURE OF THOUGHT.

DOES human thought take its origin wholly from practical needs, or is there in it from the first a disinterested element?

Some modern psychologists would say, not only that it takes its origin from needs and is posterior to action, but that it always remains in its whole structure subservient to practical ends. Just as some ancient thinkers held that virtue was simply a kind of knowledge, so for these moderns thought is nothing more than a kind of will; will itself being assumed to be primarily directed to practice. What distinguishes thought from mere trains of associated ideas is that the passive states of consciousness that enter into it are seized upon by an active "apperception," and, by being thus seized upon, are turned into connected "thought-series." The device of these psychologists might be: "*Pro ratione voluntas.*"

If, in opposition, we were to point to the Aristotelian ideal of the self-contained contemplative life, they might admit this to be a possible ideal and still maintain the essential part of their view. Perhaps they would not admit its possibility; but if they did, it would be open to them to insist that the contemplative life is still in a manner active. It is certainly not without volition. At most the volition may be supposed to become in the end unimpeded. And it is undoubtedly an ideal that in more than one way presupposes strictly practical activity in some kind of relation to it. Neither a society wholly devoted to contemplation, nor an individual human life filled with it from beginning to end, is imagined by Aristotle as possible. To decide the question as to the nature of thought, we must consider its origin rather than its consummation.

But first of all, whence comes the notion itself that thought is merely a kind of volition? It is derived, in reality, from a great philosopher; but it seems to imply either a misunderstanding or an exaggeration of his view. Descartes, in the *Principia Philosophiæ*, seeking to explain the causes of error, drew attention very forcibly to the volitional character of some thought. But he does not say that all thought is volitional. The passage where the doctrine may be found is Part I of the *Principia*, sections 31–36. The doctrine is this. Our errors depend on the will rather than on the intellect. All our modes of thinking (*modi cogitandi*) may be referred to two general ones: perception, or the operation of the intellect; volition, or the operation of the will. Feeling, imagination, and pure understanding, are modes of perception; desire, aversion, affirmation, negation, doubt, are modes of will. (*Nam sentire, imaginari, et pure intelligere, sunt tantum diversi modi percipiendi*; *ut et cupere, aversari, affirmare, negare, dubitare, sunt diversi modi volendi.*) When we affirm or deny of a thing that which we clearly and distinctly perceive must be affirmed or denied of it, we do not err. But, in order that assent may be given, not only perception but also will is required. Now the perception of the intellect extends only to a few things. It is always finite, while the will is in a manner infinite. There is no possible object of any will that cannot become the object of our will, even though we do not clearly and distinctly perceive it. From extending the will that is involved in judgment to things we do not rightly perceive, arises error.

It is evident that Descartes here does not attempt to explain thought in general as a form of volition, but only judgment in the special sense. From judgment, implying assent or denial (modes of volition), is distinguished pure understanding or pure intelligence which is wholly a "mode of perception," and to volition perception is opposed as another "mode of thought." "Perception" was of course to the older psychologists a vaguer term than it is now. It did not mean simply perception of particular objects. We may take Descartes's "pure intelligence" as meaning very much what we mean by "conception," as distinguished from judgment.

Judgment itself, which is admitted to be volitional, may be ex-

plained psychologically in different ways. The question has been put with regard to volition in general, whether it is essentially constituted by a primitive "act of apperception" that cannot be further resolved, or takes its origin from mental elements that do not at first constitute anything that can be called volition. In this last case, "apperception" or "attention" is itself a problem, and cannot be used as a datum of psychological explanation. This is the view of Professor Bain and of Dr. Münsterberg. The view that apperception must be taken as a datum is that of Professor Wundt.

However this controversy may be decided, the question still remains as to the nature of conception (Descartes's "pure intelligence") in its distinction from judgment. Professor Wundt and his disciples would explain not simply judgment but thought in general as a kind of volition; or rather, they would probably say that all thought, in the proper sense of the term, is judgment.

The argument against this view is that it ignores the whole work of modern nominalism. The English nominalists, beginning with Hobbes, set themselves to explain what is distinctive in thought as a whole, not simply in its recognised volitional form, and attained what seems a true psychological solution. They took the essential element in thought to be generality; and the possibility of generalising they explained by the existence of language. To rise from mere trains of association to general conceptions, what is necessary is a system of signs; and this is given by articulate speech. "Speech created thought." One particular perception or image—the sound or memory of a word—can be made to stand for a whole class of other images and perceptions. Man is distinguished from the lower animals by the capacity of evolving such a system. The distinctively human faculty is the power of speech and thought.

This theory has not been sufficiently considered by the apperceptionists. Still, they might conceivably accept it and push the question further back. Language itself, they might say, is the product essentially of will. All thought, therefore, must still be traced to "apperception."

There is, undoubtedly, in all choice of speech, an element of volition; as, in fully formed thought, volition enters into judging.

But is volition, in the origin of language, the essential thing? To hold that it is, does not seem to be in agreement with the best view of modern thinkers on the subject, which may be briefly stated thus. Language presupposes society. Given a group of social animals, as soon as uttered sounds aroused by certain ideas call up similar ideas in the minds of those to whom they are addressed, there is the germ of language. This germ consists in understanding, not in intentions. Sounds, once understood, can become words. What is needed is the intellectual power that can develop them.

In the case of some languages, this intellectual power seems to have consisted mainly in volition. The suggestion that the Chinese language was essentially volitional in its origin is an obvious one. Leibnitz, discussing the old question whether languages are by institution or by nature (*Nouveaux Essais*, Bk. III, Ch. 2), remarks that the language of China has been thought to be "entirely arbitrary." This, he proceeds, may be so; but the artificial languages of which we know the origin contain a "natural" as well as an "arbitrary" element. Modern philologists would say that there is something of Leibnitz's "natural" element everywhere. Signs, in the beginning, cannot be quite arbitrary, but, to be taken up by others, suppose some kind of correspondence to the thing signified, though not of course a uniform correspondence alike for all men at all stages. In the end, for ordinary speech, words become arbitrary signs, though in the evolution of language they were not so. The reason why the Chinese language seems most of all arbitrary or volitional is its extreme poverty both of vocabulary and grammatical system. Out of about five hundred monosyllables, by changes of tone and of syntactical arrangement, the whole spoken language is constructed. The share of arbitrary choice in the structure becomes conspicuous from the limitation of its material. Yet we perceive that even here the linguistic material cannot have been created by volition aiming at practical ends, but springs originally from the play of feeling and imagination. Such as it is, an eminently volitional language is in conformity with the intensely positive and practical Chinese character. It is the language of a race with neither poetry nor meta-

physics. The copious languages are the languages of races with a larger primitive endowment of imagination or feeling.

Still, this does not settle the question with which we began. Whatever may be the peculiar endowments of different races, is it not always practical need that gives the first stimulus to expression, and so ends by creating thought? That practical needs count for much in the development of thought and language is of course unquestionable. It does not follow, however, that they gave the first impulse. Animals also have "reason" in the sense that they can intelligently adapt means to ends; but in animals the disinterested emotion aroused, for example, by novelty, though not entirely absent, is merely sporadic. In the history of human life, on the other hand, there is, as a rule, a search for the æsthetic before the useful is sought for. Is it likely that language is here an exception? The question is not as to the external occasion on which language arose. As has been pointed out in recent discussion of the subject, the occasion may not always have been the same. The fundamental question is this: What is the internal psychological cause by which it is first determined that there shall be articulate expression at all?

To find a clear solution of this question, we must return to the first of the modern Nominalists, to Hobbes. In the treatise commonly known as the *Human Nature*, but recently published by Dr. Tönnies as part of the whole to which it originally belonged, namely, *The Elements of Law, Natural and Politic*, there occurs a paragraph (Ch. 9, § 18; ed. Tönnies, pp. 45–46) in which the problem is incidentally solved. Hobbes is treating of the passions he calls "admiration and curiosity," by which, as also by "the faculty of imposing names," man is distinguished from beasts. "For when a beast seeth anything new or strange to him, he considereth it so far only as to discern whether it be likely to serve his turn, or hurt him, and accordingly approacheth nearer it, or flieth from it; whereas man, who in most events remembereth in what manner they were caused and begun, looketh for the cause and beginning of everything that ariseth new unto him. And from this passion of admiration and curiosity, have arisen not only the invention of names, but also the supposition of such causes of all things as they thought

might produce them. And from this beginning is derived all philosophy: as astronomy from the admiration of the course of heaven; natural philosophy from the strange effects of the elements and other bodies."

The luminous suggestion that "the invention of names" has arisen from "admiration and curiosity" is in perfect agreement with the view that derives theoretical science from the same origin. That it is essentially these two passions that set science going and keep it in movement is sufficiently clear from experience. Practical needs lead to applications of the science that exists, and these applications again determine new theoretical problems; but they are not the central cause of the pursuit of science. From this pursuit, the usual effect of practical needs is to draw men away. They may direct the attention of societies to the importance of science, but they will not determine individuals to follow it. To work at science strictly in view of practice keeps it stationary. We see this in the cases of Egypt and Chaldæa, where geometry was kept to the purpose of land-measuring and building, and the stars were observed chiefly with a view to predicting events that had a bearing on national or individual prosperity. The same thing holds of language. Its beginnings were theoretical, æsthetic, disinterested. To a great extent its development depends on persistence of the original impulse; on the leaving of men's minds in some measure free from subjugation to external ends and motives. Literature has a larger vocabulary than daily life. The vocabularies of the Aryan and the Mongolian are at opposite extremes. To develop a utilitarian civilisation too early was to lose possibilities both of scientific and linguistic growth. Language, as Hobbes saw, like the search for causes, springs from what is distinctively human in human nature; and this is not direction of the mind to the interests of life. The large part interests play in Hobbes's practical philosophy only makes his position on this point the stronger.

With the question about language, the question about thought, from which we started, is solved.

LONDON. THOMAS WHITTAKER.

LITERARY CORRESPONDENCE.

FRANCE.

M. G. MILHAUD just publishes his *Leçons sur les origines de la science grecque*, a highly interesting work, from which the students to whom it is addressed will derive much profit. The source from which M. Milhaud has drawn his materials is the remarkable and learned work of M. PAUL TANNERY, *Pour l'histoire de la science hellène (de Thalès à Empédocle)*. Although this latter work dates back to 1887, I must mention it here as an authority of the first order for the study of scientific theories.

To construct the history of science is tantamount to a construction of the history of philosophy. Every serious philosophical education should commence at this point. How can we estimate the worth of the theories which have succeeded one another in the progress of the centuries if we are incompetent to judge of the facts upon which scientists and philosophers have successively founded their hypotheses? Modern doctrines would resemble fairy tales to one who did not give some study to the habits grafted in the human mind by the disciplines of times gone by, and to the new conditions which a new science imposes on thought. What a host of intermediary links exist between these centuries of Greek history which M. Milhaud[1] and M. Tannery call to life again, and the modern epoch to which M. CH. ADAM brings us in his book, *La philosophie en France (Première moitié du XIX. siècle)*!

[1] I shall simply mention to-day M. Milhaud's dissertation for the degree of doctor, which he publishes under the title, *Essai sur les conditions et les limites de la certitude logique.*

M. Adam's book is a fine performance, and I may recommend it to persons desirous of becoming acquainted with the evolution of ideas in our country. Its analyses are made with lucidity, sobriety, and with no pretension except that of exactitude. In the first part we see marshalled M. de Bonald, Joseph de Maistre, Lamennais, Lacordaire, and Montalembert, the representatives of a movement effected entirely within the bosom of Catholicism; in the second part, Maine de Biran, Ampère, Royer Collard, Cousin, and Jouffroy, a philosophy of half-blood, as it were, which remained too Voltairian for religion, too metaphysical for science, and too subjective for practice; in the third part, Saint-Simon, Fourier, Pierre Leroux, Jean Reynaud, and finally Auguste Comte, men of unequal ability, but all of whom represented the positive philosophy, took a strong interest in real life, and conceived philosophy in its last offices as a social and religious discipline. To these belong the future,—we can see it in the lasting influence of Comte,—for they had a very just feeling of the needs of modern times. M. Adam cheerfully recognises this, and I am not the one to reproach him for his preferences in this matter.

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In the departments of physiology and psychology I shall mention first the French translation by M. P. Langlois of A. Mosso's book, *La fatigue intellectuelle et physique*, upon the whole an excellent, instructive, and pleasant work, but slightly discursive. Two conclusions, in my opinion, follow from M. Mosso's researches. The first is, that although fatigue is the condition of progress, it ought not to be imposed upon man too early in life; the other, that we are complicating life too much and constantly rendering it more artificial. The education of children, being confided to common pedants, often begins with thwarting nature, and an excessively refined civilisation ends with deforming it. Taine said one day, in the pardonable freedom of conversation: "The prevalent system of education is one of the greatest abuses of the present century; but we must not speak evil of it, at least openly, for there are many people who make their living by it." Meanwhile, serious educators may be found, and these will profit by Mosso's work.

But it is still not said that fatigue has no other cause than productive labor, the overwork of brain and muscles. It also springs from vice, and the degeneration, which arises from social illness, constantly contributes to augment it. To this question of fatigue DR. PAUL AUBRY'S work, *La contagion du meurtre, étude d'anthropologie criminelle*, is devoted.

Dr. Aubry shows by examples that murder is contagious, and that this contagion is spread by the habits of families, by the living together of prisoners, by the witnessing of public executions, and, finally, by the press. On this last point Dr. A. Corre, who has written the preface to this work, is not of the same opinion with M. Aubry. The latter asks for laws repressing the liberty of writing and of speech; the former is a partisan, though an uneasy one, of the absolute liberty of the daily press, books, and speech. Good reasons, *pro* and *con*, are not wanting, yet I think that it is possible and prudent to prohibit at least the *illustration* of crimes in public journals, and so prevent the spread of this contagion by *pictures*, which are so suggestive. With respect to the discretion to be observed in newspaper reports, the good-will and assent of journalists are hardly to be expected; they would be loth to sacrifice reasons of interest to reasons of morals. Did we not hear, only a few years ago, the representatives of the Parisian press declare legitimate the publication of documents abstracted from the depositories of the courts of justice!

"The means of bettering this condition of affairs," thinks M. Corre, "is to be sought wholly in a system of instruction and education fully adapted to the wants of modern society." No doubt. But that is sooner said than done, while in the meantime the dangers of a life without religious or scientific discipline are aggravated. Even certain moral habitudes which take the place of rules in life are falling into desuetude.

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Restorations are improbable and invariably inefficacious. One is obliged to recognise this fact anew after the perusal of such studies as those put forth by J. E. ALAUX, under the title of *Philosophie morale et politique*. M. Alaux is a man of elevated thought

and possesses a deep sense for the difficulties which weigh down upon us. But the spiritualistic deism to which he has remained faithful no longer satisfies us, and it would scarcely seem as if the unity of human consciousness was to establish itself in the future on the principles of the old spiritualism. That the reaction has been excessive I do not deny, and every voice merits the privilege of an audience if only it is sincere.

Still, it is impossible for me to attach much importance to attempts at the rejuvenation of existing religions, which are especially manifested in the Reform Churches, more flexible than the Roman. This latter, indeed, has picked up again in the doctrines of Thomas Aquinas a certain philosophical direction ; but I see by recent works that the most advanced members of the clergy do not dare to renounce the doctrine of miracles. To seek to-day one's point of support in ignorance approaches the tactics of despair. I shall refer the curious reader of works of a theological character to the reviews of M. F. PILLON in the *L'Année philosophique*, 1894.

There is much talk about the Buddhistic propaganda. It is with us a mere fad. Even persons who are afflicted with a taste for the supernatural and the marvellous do not seem disposed to fetter themselves with the rules of the past. With much more reason, therefore, do our liberal minds dismiss with a smile our few panegyrists of the Asiatic religions. "There is no reason why a man who has been released from one prison would strive to enter another," we read in the sprightly and forcible *Current Topics* of General Trumbull, to whose memory I may be permitted to address a word of sincere and respectful homage from France.

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I have not to speak of purely literary works here. There are, however, two studies of Victor Hugo which I should mention, as they relate partly to psychology. The one is from the pen of M. CH. RENOUVIER, *Victor Hugo le poète*, (A. Colin, publisher,)[1] the other by M. L. MABILLEAU, *Victor Hugo*, (Hachette, publisher).

[1] Works not thus excepted are published by F. Alcan.

The reader will find here some excellent pages on the question of images and imagination, with many valuable remarks.

The last work of M. CH. LETOURNEAU, *L'évolution littéraire dans les diverses races humaines* (L. Battaille, publisher), raises a question of broad scope. M. Letourneau continues in this volume the laborious investigations which he has undertaken regarding the evolution of the fundamental facts of society, evolution, family, property, politics, law, and religion. It is not possible, one will think, to attack subjects as diverse as these with equal competency. And the author's criticisms are not always exact. He has reached, however, solid results, agreeing in his main points with M. ERNST GROSSE who published simultaneously in Germany a remarkable work under the title *Die Anfänge der Kunst.*

M. Letourneau points out to us the original union among all nations of dancing with music and poetry; the exceptional importance of dancing from the point of view of social interests; the origin, in the pantomime or mimetic dance, of the drama, which would be thus a primitive form and not appearing by necessity after the epic, as the exclusive study of the Greek classics have induced people to believe. He has clearly pointed out the predominance of rhythm in the music and poetry of savages without mentioning their feeble sense for musical intervals, which is frequently almost null according to the inquiries of M. Grosse.

But to what extent is the fate of literature connected with the social conditions in which it appears? M. Grosse responds to this question with the invocation of an economical element, *production*—a precise criterion, but one which becomes insufficient as soon as we go beyond the primitive stages of humanity. M. Letourneau, whose researches properly extend further back, has sought to trace literary evolution to political evolution, making this last consist chiefly in the passage of the communal clan or republican rule to a monarchical form of government. Unfortunately he does not develop his law with sufficient exactness and the passage or transition of which he speaks escapes us as soon as we replace his words "republic" and "monarchy" with actual facts.

But this remains true, that prolonged oppression, no matter

what its source, and the exercise of extreme authority, result in stopping the expansion of human genius, as soon as a race has not, or no longer has, a sufficient reserve energy. This statement, however, is simply tantamount to saying that the literature of a people declines with its vitality, and the causes of this decline present to us a vast and difficult problem. Some of these causes M. Letourneau points out. Especially is he not assured of the future of the peoples of the West. His picture would have been more complete if he had said that the nations are menaced with incapacity for discipline as much as by excessive discipline. No doubt, the deep-seated evil here resides in the absence of moral cohesion, in the growing triumph of egoism over altruism. But this mortal consequence may set in under forms of government and political conditions which widely vary.

But what becomes, in all this, of the vague factor of *race*, which M. Taine, for example, has so overtaxed. The genius of the race is a character which must not be absolutely neglected. Still one will observe that the results set forth by M. Letourneau (and this is a circumstance which has not escaped M. Grosse), are equally justified by the study of tribes belonging to different ethnical groups. The influence of race, accordingly, bears more upon the quality of literary works than upon the general evolution of literature. With respect to the law of evolution, this yet remains to be discovered. At all events, it is much to understand history better, and the possession of exact descriptions is a great step in advance.

LUCIEN ARRÉAT.

PARIS.

CRITICISMS AND DISCUSSIONS.

THE LIFE OF ISSA.

About a year ago a little book was published in French by a Russian who calls himself Nicolas Notovitch, and its title is *The Unknown Life of Jesus Christ, by the Discoverer of the Manuscript.* The sensation which it naturally created has made it known over the whole civilised world, so that the English translation which we now have before us commands an extraordinarily large sale.

Mr. Nicolas Notovitch's book is a curious and interesting production. It contains the accounts of the author's journey to Tibet. There are a few thrilling hunter's stories. Our hair is made to stand on end by the report of the horrible death of a coolie in the clutches of a hungry panther, devouring his victim and escaping in the dark. We hear of the successful killing of a black bear. The mind is relieved by an ethnological discussion of the piquant institution of polyandry; then again our attention is engaged by a dramatic description of a pageant such as we are accustomed to witness on the stage. Several discussions with Buddhistic lamas are introduced whose long speeches are ill-disguised reproductions of the author's own religious views, which occasionally ooze out in other parts of the book. Hearing of a manuscript on the life of Issa (which is the Tibetan form of the name of Jesus), he sets out in search of the manuscript of the valuable work, and at last happily finds it through the unfortunate accident of a broken leg. Here again the author surprises us with a report of wonderful adventures, and we must admire his extraordinary physique and almost superhuman endurance. Having broken his leg above the knee, he orders his servants to take him to Himis, which, as he says, was only half a day's journey, one man constantly supporting his injured limb, another man leading his horse by the bridle. Having reached Himis at a late hour of the night he was well received by the monks and borne to their best chamber. Without telling us how he passed the night, he continues:

"The succeeding morning I encased the injured member in thin boards held together with strings, and did my best to remain motionless. A favorable result was soon apparent, and two days later I was well enough to undertake a slow journey toward India, in quest of a physician."

In these two days, which, after half a day's journey with a broken leg, he spent at the Himis convent, Mr. Notovitch found sufficient composure to make himself acquainted with the contents of the manuscript of the life of Issa. He says:

"The venerable director of the gonpa entertained me with interesting accounts of their belief and the country in general. . . . Finally, yielding to my earnest solicitations, he brought forth two big volumes in cardboard covers, with leaves yellowed by the lapse of time, and read the biography of Issa, which I carefully copied from the translation of my interpreter."

Then follows the translation of the manuscript of the life of Issa, with the author's comments. The manuscript gives in Sections II and III a brief report of the history of the children of Israel, making, however, Mossa (Moses) the younger son of King Pharaoh. The fourth section informs us of the Eternal Spirit, who sees fit to incarnate himself again in a human being. The child is called Issa; and having attained the age of thirteen years, when an Israelite should take a wife, he clandestinely left his father's house and travelled towards Sindh, "to study the laws of the great Buddhas." Section V tells us of Issa's experiences in India, his denial of the divine origin of the Vedas, his denial of the Trimurti, his denunciations of Hindu caste institutions, and his condemnation of idol-worship; he said:

"The Eternal Judge, the Eternal Spirit, composes the one and indivisible soul of the universe, which alone creates, contains, and animates the whole.

"He alone has willed and created, he alone has existed from eternity and will exist without end; he has no equal neither in the heavens nor on this earth.

"The Great Creator shares his power with no one, still less with inanimate objects as you have been taught, for he alone possesses supreme power.

"He willed it, and the world appeared; by one divine thought, he united the waters and separated them from the dry portion of the globe. He is the cause of the mysterious life of man, in whom he has breathed a part of his being.

"And he has subordinated to man, the land, the waters, the animals, and all that he has created, and which he maintains in immutable order by fixing the duration of each.

"The wrath of God shall soon be let loose on man, for he has forgotten his Creator and filled his temples with abominations, and he adores a host of creatures which God has subordinated to him.

"For, to be pleasing to stones and metals, he sacrifices human beings in whom dwells a part of the spirit of the Most High.

"For he humiliates them that labor by the sweat of their brow to gain the favor of an idler who is seated at a sumptuously spread table.

"They that deprive their brothers of divine happiness shall themselves be deprived of it, and the Brahmans and the Kshatriyas shall become the Soudras of the Soudras with whom the Eternal shall dwell eternally.

"For on the day of the Last Judgment, the Soudras and the Vaisyas shall be forgiven because of their ignorance, while God shall visit his wrath on them that have arrogated his rights."

Note here how modern Christ is when referring to the labor question.

"Six years later," we are told in Section VI, "being persecuted, Issa, whom the

"Buddha had chosen to spread his holy words, went from place to place preaching "monotheism, denouncing idolatry, and proclaiming the ethics of universal kindness. "At last he returns to Palestine, where the rulers of the cities, and especially Pi- "late, the governor of Jerusalem, attempted to take his life, but the priests and the "learned men of the Hebrews defend him and succeed for some time in protecting "him. The spies of Pilate, however, succeed in implicating Issa into new accusa- "tions, whereby Issa takes occasion to admonish his disciples to respect women "and to be submissive to their wives. Put into a dungeon, the Jews tried to save "him, but in vain, and Issa was nailed to the cross between two thieves. The "priests and the wise men of the Hebrews washed their hands in a sacred vessel, "saying: 'We are innocent of the death of a just man.' As the multitude prayed "over the tomb of Issa three days after his death, and filled the air with weeping "and wailing, the governor, fearing a general uprising of the people, sends his "soldiers to take up the body and bury it elsewhere. When the sepulchre was "found open and empty, the rumor was spread that God, the Supreme Judge, had "sent his angels to take away the mortal remains of the saint in whom dwelt a part "of the Divine Spirit."

The comments which the author adds are peculiarly interesting as they furnish abundant evidence that the manuscript is nothing but an exposition of Mr. Notovitch's own religious opinions. Yet he appears honestly to believe in the anachronism that his views were held at the beginning of the Christian era, for he does not seem to doubt that the life of Issa as told in the Himis manuscript was written shortly after Christ's death.

After this analysis of the book, which is a mixture of everything which is liable to excite the reader's sentiments, it is scarcely necessary to enter into a detailed criticism or to raise the question whether or not the manuscript is genuine. Mr. Notovitch expresses his confidence that further investigations will verify his report. Up to date we have little evidence which will verify or contravene Mr. Notovitch's statements; but the little which we have is against him. According to the Philadelphia *Sunday School Times* "The Rev. F. B. Shawe, a Moravian mis- "sionary of Leh, the chief town of Ladakh, has just asserted (1) that Buddhists do "not venerate Jesus, or Issa, at all; (2) that his colleagues have had easy access to "the very monastery named by Notovitch for forty years, and never so much as "heard of such a Life; (3) that no one in that vicinity can be found who has seen "or heard of Notovitch; (4) that the monks deny that they have any old books,— "least of all, one 1694 years old, or a copy of it; and that (5) Pâli is an unknown "language to any native of Ladakh."

We wish to add two remarks.

First, the existence of an apocryphal gospel written by some Buddhist hagiographer as a blending of Christianity with Buddhism is by no means impossible, yet, if such a book were found, it would possibly contain many traces, not of Mr. Notovitch's religious views, but of peculiarly Buddhistic tenets; and among them

the most prominent ones would be those of the sect to which the author of such a gospel had belonged. In addition it would misrepresent Jewish social conditions in a different way from Mr. Notovitch's life of Issa, as a Buddhistic author would color the report with the notions of the social conditions in which he lives. Should such a manuscript be found it would naturally, as does Mr. Notovitch's manuscript, represent Issa as having acquired his wisdom in India, but this, of course, would be poor historical evidence to prove that Jesus really had travelled to India.

Secondly, we have to say, considering the popular interest taken in the affinity of Buddhistic with Christian ethics, and the prolific exuberance of theosophic literature, it is strange that no one ever attempted, before the appearance of Mr. Notovitch's booklet, to invent a story which in the shape of a novel, or otherwise, would provide the public with a Buddhistic-Christian gospel, such as many people would like to see.

Mr. Notovitch's book, we repeat, is curious and interesting; but the reader who has not his grave doubts as to the authenticity of the manuscript of the life of Issa, must be possessed of an unusual amount of naiveté. Whatever may have been the author's intention in writing the book, he did his work most ingeniously, for the very crudeness with which he urges his claims is well calculated to captivate the crude taste of the masses who would remain unaffected by a more refined and historically more probable production. Had the manuscript of the life of Issa been written with a better historical knowledge of the past, it would undoubtedly have failed to interest the masses whose attention can be captivated only by a literature which anticipates their wishes and reproduces their own thoughts. Goethe says:

"Darf man das Volk betrügen?
Ich sage nein!
Doch willst du sie belügen,
Mach's nur nicht fein."

P. C.

BOOK REVIEWS.

HISTORY OF MODERN PHILOSOPHY, from Nicholas of Cusa to the Present Time. By *Richard Falckenberg*, Professor of Philosophy in the University of Erlangen. Translated with the Co-operation of the Author, by *A. C. Armstrong*, Jr., Professor of Philosophy in Wesleyan University. New York: Henry Holt & Co. 1893. Pp., xv and 655. Price, $3.50.

The appearance of Falckenberg's *Geschichte der neueren Philosophie* in an English dress supplies a welcome addition to the facilities for the study of modern philosophy. The aim of the work as stated by the translator in his preface, is "to be at once scientific and popular, standing midway between the exhaustive expositions of the larger histories and the meagre sketches of the compendiums." The book itself will bear witness to the unusual degree of success which has attended the execution of this purpose. Dr. Falckenberg has been peculiarly well qualified by his experience as a teacher, as well as by his extensive and accurate acquaintance with the history of modern philosophy, to produce a work that combines, in convenient compass, an adequate presentation of the outlines of modern thought, with practical adaptability to the requirements of students in the class-room.

The leading features which distinguish Falckenberg's work are the following. *First*, its treatment of the transition from Nicholas of Cusa, the "path-finder" of modern philosophy, to Descartes, its real founder, in a section which is not only very important in itself but also serves as a valuable introduction to the movements which follow. *Secondly*, its style, which is a model of compactness and perspicuity, being almost entirely free from that obscurity and involved phraseology which is so common in German philosophical writers and so perplexing to English readers. The influence of such masters as Kuno Fischer is here quite manifest. *Thirdly* its intelligent and sympathetic treatment of English thought. Schwegler set the bad example which most of the Germans have followed, of regarding English thought as a kind of side issue and giving it but cursory attention. Falckenberg, on the contrary, belongs to that group of contemporary German writers who have awakened to the fact that there has been a real movement of English thinking and that it possesses great historic importance. An English reader might not fully concur

in his estimate of Bacon, for example, but he could find little to criticise in his full and intelligent treatment of Locke, Berkeley, and Hume, the English deists and moralists and the representative thinkers of the eighteenth century. No other German, in a work of the same size, has treated the movement of English thinking so fully or with more intelligent appreciation. A *fourth* characteristic which is a distinctive feature of the work, is its thoroughly objective method, Falckenberg aims to be a simple interpreter of systems and movements, keeping his own subjective opinions in the background and using criticism as sparingly as possible. Such a method has its limitations, of course, and there is room for honest divergence of opinion as to the extent, for example, to which the historian may go in the employment on abdication of the critical judgment. The advantages of the objective method as conceived by Falckenberg, are, however, too apparent to require specification; and his employment of it, his manifest impartiality and his clear and masterly expositions, will tend to disarm criticism.

The work with which this treatise of Falckenberg's is likely to be brought into the closest comparison, is that of Windelband which has also been favored with an English dress. But the two works occupy different places. Windelband is specially adapted to the requirements of advanced students and presupposes that elementary acquaintance with the contents of systems and historic movements which is so admirably supplied by Falckenberg. Falckenberg's treatise will hold a place of its own as the best accessible historical *Einleitung* to the study of modern philosophy.

The translator has performed his part with conscientious fidelity and with marked ability. Enjoying exceptional facilities for his work, he has succeeded in making into excellent English a very faithful reproduction of the original. Professor Armstrong, like the author, is an experienced teacher and has been guided in his labors by the same sense of the practical needs of the class-room. An important addition which appears in the English version is found in the chapter on philosophy in Great Britain and America which has been completely re-written and greatly enlarged. Some other changes of minor importance have also been made. The work will doubtless be welcomed as an important addition to the text-book facilities for the study of philosophy in our colleges and universities. A. T. O.

BASAL CONCEPTS IN PHILOSOPHY. An Inquiry into Being, Non-Being, and Becoming. By *Alexander T. Ormond*, Ph. D., Professor of Philosophy in Princeton University. New York: Charles Scribner's Sons. 1894. Price $1.50. Pages, 308.

A note of high and noble seriousness pervades this work, which, differ from it how we will, strongly commands our respect and attention. The emphasis which it lays upon the religious problems of philosophy, the strong and determined stand it takes against the *faule Weltweisheit* of the day, the moderation and tone of its criticism, place it apart, immeasurably apart, from the flippant and intemperate productions of the period. "The masses of the intelligent are espousing agnos-

"ticism, not as the result of any reasoned conviction, *but out of sheer inability to* "*rise above the middle axioms of human thinking*. . . . The spirit of the time is not "lacking in scholarship or zeal for the truth: what it needs most is a fresh baptism "in the fountain of insight." "The greatest thought of the human spirit is the "thought of God." "The human soul is the highest actualisation of the spiritual "potence that is immanent in the world." Who would not give assent to the spirit of such utterances? In them Professor Ormond places his finger on the central problems of philosophy, and characterises clearly the fundamental defect of a great part of modern thought. Yet, having said this, we must say, too, that from his chief results, and especially from his *method*, we differ *in toto*.

Professor Ormond is a successor of Dr. McCosh and now occupies the chair of philosophy at Princeton. His theory is, broadly speaking, Realism. "The world is a "solid and firm-jointed reality which confronts the knower and fills his categories "with objective content from the beginning to the end of the process of experience." His method is the ontologic method ("ontologic" being understood here in its historical sense), and is diametrically opposed to the method of the Positive philosophies. Positive philosophy *goes up* from facts to abstractions; ontologic philosophy *comes down* from abstraction to facts. It sets itself such problems as these: "How does the Absolute become the Relative, especially the *Imperfect* Relative?" Answer, through Non-Being. In this art Hegel is the greatest adept. The extent to which Professor Ormond adopts this method may be seen from the fact that he regards Hegel's "restoration of the negative as a necessary philosophic datum" as a great stride in philosophy. He says: "The world is the *other* of Absolute spirit. ". . . In going out from itself it *others* itself, and this other is its negative or not-self. "The not-self is the world, and thus the world and its process are mediated by ne- "gation."

The universal complaint of German philosophers, says Heine, is *das Nichtverstandenwerden*, "not being understood." "Nur einer hat mich verstanden," said Hegel plaintively on his deathbed, "Only one man ever understood me," and, as the appalling implications of that confession dawned upon him, he turned and added in his last gasp, "*und der hat mich auch nicht verstanden*," "and he didn't understand me *either*!" Yet it would be wrong, from Heine's witticism, to suppose that Hegel's work was all for naught in the history of philosophy.

We shall now quote a few passages which will show what Professor Ormond's theory of knowledge is. He says: "Knowledge is founded in categories, and its "successive stages arise not primarily, out of the generalisation of facts, but rather "out of the emergence of new categories under which our generalisations are to pro- "ceed. We not only generalise facts, but our reflexion rises from categories of space "and time to those of substance and cause, and only rest finally in the supreme "ideas of unity and ground." In another place: "Self-consciousness is the first "principle of knowledge." And again: "The psychological categories must be "translated from subjective to objective universals.

The main motive of the volume is "a desire to restore the primacy of certain "conceptions which are in danger of disappearing from our modern thinking." Dissenting from monistic pantheism on the one hand and from agnosticism on the other, the author has sought in laudably small compass to reconstruct philosophy "upon the trinal categories of being, non-being, and becoming." Of the whole inquiry the aim "has been to penetrate the mysteries of the Absolute only so far as may be "necessary in order to discover how it rationally grounds the relative order." With respect to religion, we have as data, "(1) a transcendent Absolute whose energy "functions creatively in the world as an immanent spiritual principle or potency; (2) "the human soul a spiritual principle passing perpetually from potence to actuality "and thus epitomising the world-progress from mechanism up to actualised spirit: "(3) the logos which functions immanently as man's ideal law-giver and transcen-"dently as the organ of divine communication to the human soul."

Being, Non-being, Becoming, the Absolute, the Negative, the Logos, the a-Logos—such are the conceptions whose primacy Professor Ormond wishes to restore. Students who are unaccustomed to the symbolism of the ontological school will find this book difficult and baffling reading. But Professor Ormond expresses the hope that "the discerning reader will penetrate the shell to the kernel that it conceals." We hope that in a second edition of the work Professor Ormond will add an index, or at least an analytical table of contents. T. J. McC.

THE SCIENTIFIC STUDY OF THEOLOGY. By *W. L. Page Cox*, M. A. London: Skeffington & Son, 163 Piccadilly, W. 1893. Pages, 180.

It will be interesting to examine the views of a vicar of the Church of England, who prefaces his work with the words of St. Paul: "Prove all things, hold fast that which is good"; for we should expect much of enduring value from the work of a man who, though he adopts a scientific criterion of truth for religious researches is yet inclined by calling and by nature to do justice to the historico-religious beliefs of humanity. In examining first why "theology should be studied as the other sciences are studied" Mr. Cox finds that the modern disturbance of faith is not due so much to the apparent collision of the doctrines of religion and the truths of science, as to the fact that the doctrines of religion are supposed to lie for the most part outside of the scope of a strictly scientific inquiry. This, he contends, is not so. Theology is just as much a legitimate field of scientific research as are the other departments of knowledge. The trouble hitherto has been that theologians have doggedly adhered to exploded methods whilst scientists have studied the subject chiefly with implements which are not perfectly adapted to the ascertainment of truth in this province. Having overthrown the arguments of the dogmatists, having undermined their positions, the scientist has not yet established the real truth. Apart from all controversy, unprejudiced people will admit that the impugned articles of Christian faith do represent in some measure the actual teaching of Christ, that they have inspired the purest morality that has been exhibited on earth, and all re-

ligiously minded people must feel that somewhere the process of reasoning is defective by which it is contended that the fundamental articles of the Christian faith are unworthy of belief. The fact is, that the scientists who have studied this question have not studied the question "scientifically," and have rejected certain classes of truths which are of the very essence of the subject. One party places too much emphasis on one side of the question, the other on the other. The best hope of final agreement about the subject-matter of religious belief is to be looked for in the adoption by all of a common method of inquiry. This reform must come from theologians who have nothing to lose and much to gain by coming down from their high standpoint of authority and *a priori* reasoning. The work must be done by them and not by hostile hands. Theology must be made a science in the truest sense of that word, exactly as ethics has been made a science. But it may be objected that theology relates to God, and hence its subject is without the range of human observation. This, however, only shows the difficulty of the science, and not its impossibility. Theology, Mr. Cox contends, deals with a class of facts which are only discernible and appreciable by those whose intelligence is illuminated by purity of heart. By inductive reasoning it can be proved that the "things of the spirit of God" ought to be "spiritually judged." Certain facts concerning the nature and will of God are only ascertainable in the first instance by those in whom high intellect is combined with high character, to whom sources of knowledge are opened to which men of less mental elevation cannot penetrate.

It may be interpolated, that this view, true as it undoubtedly is, is exactly that which led to the present state of things in the ecclesiastical world. It is the argument, which most theological philosophers and churchmen use; it is the organon for the discovery of God which Professor Knight sets up; and it is the "illative sense" of Cardinal Newman by which the whole Roman Catholic theology is justified. But it is scarcely more true in theology than in other fields. Even in exact science, profound instinct and rich experience are necessary for great discoveries, By its admission, too, there is almost as much danger of the engenderment of authoritative scientific guilds as there is of the creation of infallible ecclesiastical authorities. But every one will see that between the two cases an absolute comparison is not to be made. The world of gross natural facts is always at hand, and definite decisive experiments can be performed upon it at any moment. But experiments decisive of the laws of ethics and theology take generations and generations, nay, even conturies. When it is reflected, as Gauss intimates, that even the foundations of dynamics were *historically* verified, we shall not be surprised that the important and necessary truths of the difficult domain of ethics and theology must wait ages for their scientific establishment.

The following, according to Mr. Cox, are the points upon which students of religious truth ought to arrive at some consensus of opinion: (1) That statements of the Bible concerning scientific matters should be treated exactly in the same way as similar statements in all other books; for example, the Genesis account of the origin

of the species; the stopping of the sun in its course, although here Mr. Cox makes the fine distinction that the question is whether God ever *did* make the sun stand still, not whether he *could* make it stand still. It seems to us that the best scientific decision of this question is the view of the Hindu philosophers, namely, that even God himself is not superior to his laws. (2) That questions of literary and historical criticism must be freed from the embargo of authority; for example, the authorship of the books of the Bible is not to be predetermined, etc. (3) That in the investigation of the subject-matter of religious belief very high authority is to be attached to the opinions of men of the most approved wisdom and the most conspicuous purity of life. Religious truth has always been brought to light not by mere students and philosophers, but by men who have had a peculiar power of discerning it. It has not been reasoned out but "seen." Here, again we have the "illative sense" which leads up inevitably to revelation. (4) Doctrines and dogmas may be legitimately examined. (5) That faith is a legitimate factor in the building up of a personal belief in doctrines which clearly only lie in the region of the probable. (6) That questions of religious rites and ceremonies must be decided by the test of propriety and utility. (7) That the theologian should be open-minded, conversant with all sciences, unprejudiced, and sincere.

In the second, third, fourth, fifth, and sixth chapters of the book, Mr. Cox shows what conclusions are likely to be arrived at by an application of the scientific method to some of the articles of Christian belief most controverted, namely, God, immortality, the miracles, and the principles of worship. With respect to God, his method leads to the usual conclusion of science, best expressed in Matthew Arnold's words: "A stream of tendency that makes for righteousness," or the power which compels obedience to its laws on pain of destruction. We have no data for making positive statements about the essential nature of God, yet "His nature is in every respect higher than that of man." We speak of Him in terms of personality because otherwise we could have no satisfactory religious relations with Him. But to pray to Him, and prayer is claimed to be necessary, we must address ourselves to Some One, a Father. In other words, it can be scientifically proved that there is a solid substratum of fact underlying the doctrine of the Christian church concerning the fatherhood of God, the divine providence, and the efficacy of prayer. In fact, Mr. Cox's position here seems to be, that we must not dogmatise about such matters, but that we cannot help dogmatising a little bit about them. We are led also by a process of scientific reasoning to see a triple manifestation of God: (1) in nature and the laws of nature; (2) in perfect humanity; and (3) in the higher impulses which act upon men, although for all we know there may be more manifestations; but the Christian church has done invaluable service in popularising this truth by its doctrine of the trinity in unity. Of course, the idea of the trinity must be purified of its absurd theological subtleties. But trinitarianism is no more a dogmatic system than unitarianism. Mr. Cox's exposition of this idea is well put and deserves the attention of unthinking scorners of the trinity of God.

When he comes to the question of future life and of miracles, Mr. Cox seems to overlook the principles which he laid down in his first chapter or at least not logically to apply them. He first finds that science can affirm or deny nothing with respect to the future life of man, therefore we must decide it upon some other kind of evidence, different from that which is supplied by the physical sciences. That other kind of evidence is what has always been adduced here: the momentousness of the question, which inclines us to reckon upon so blissful an uncertainty, be it ever so small; the insight of poets and seers; the testimony of the common consciousness of humanity; and lastly, but chiefly, the utterances of Christ, "whose pronouncements are of the nature of positive proof." Mr. Cox's attitude here is very strange. He says, it is in the highest degree unscientific to assume the negative of so profoundly important a question. But how about assuming the positive of it? If the question is scientifically unanswerable, then a scientific theology should not attack it; in its unanswerable form it is not a true scientific problem, but should be restated as the problem of God has long since been restated, and answered in some such way as that was answered by the author.

It is the same with the question of miracles. It is almost incredible that an author, who states that "Moral truth and religious truth are to be proved, just as "truth of physical science is to be proved, by observation and experiment and, "when necessary, by correct logical argument; a new 'revelation' is like a new "scientific theory; a man promulgates a new doctrine in morals or theology, just "as an observer of facts in nature promulgates a new doctrine concerning the cor-"relation of those facts,"—could yet ultimately give a rationalistic explanation of miracles. How different from this is Mr. Cox's attitude on the question of worship, where it is his belief that "to hold frequent communion in spirit with the "Infinite Ruler of all, and to live in dependence on His power and goodness and in "obedience to His laws, are the only absolutely indispensable conditions of render-"ing to Him that worship which is His due." Upon the whole we must say, with all due respect for the author's unusual abilities and logical powers, that Mr. Cox has not, on the questions of future life and miracles, consistently carried out the scientific declarations of his premises. T. J. McC.

DIE SÂMKHYA-PHILOSOPHIE. Eine Darstellung des indischen Rationalismus nach den Quellen. By *Richard Garbe*. Leipsic: H. Haessel. 1894. Pages, 347.

Considering the fact that Buddhism has sprung from the Sâṃkhya philosophy, it is to be anticipated that the present work, which is the first attempt at giving a systematic exposition of its nature, history, and tenets, will meet a widespread demand, not only among scholars, but also among the public at large. Professor Garbe, the translator of the most important Sâṃkhya texts, is of all our Sanskrit scholars pre-eminently fitted to be the interpreter and expounder of the Sâṃkhya system, and indeed this work of his brings his former historico-philosophical labors

to a certain consummation, showing them in their importance, and allowing us to understand the plan of his studies.

The Sâṃkhya philosophy, founded by Kapila, is closely connected with Buddhism. The Sâṃkhya philosophy is the mother of Buddhism, and Buddha has derived from it many of the fundamental teachings of his religion. Many terms, and the solution of many problems, were adopted by Buddha without essential change. Especially the four noble truths are plainly foreshadowed in the Sâṃkhya philosophy. Both the Buddhist and the Sâṃkhya philosophers hold that life is suffering, and that efforts must be made to deliver us from the evil of suffering. The contents of the Sâṃkhya doctrine has been formulated in the following four tenets: (1) what one must deliver oneself from is pain; (2) deliverance is the discontinuance of pain; (3) the cause of that from which one must deliver oneself is a lack of discrimination, which is based upon the connexion of the soul with matter, and produces pain; (4) the means of deliverance is the discriminating cognition. Not only the method of stating the problem of the deliverance from evil under four heads, but also the very formulation of these four sentences have, to a great extent, been retained in the Buddhistic terminology. Nevertheless, a great change is noticeable from Kapila to Buddha, and indeed it is a change for the better. It is a progress of paramount importance. Says Professor Garbe, on page 143: "The "original Sâṃkhya doctrine declares even good works do not enhance but hinder the "attainment of the discriminating cognition (which is the means of salvation). Ac- "cordingly, nothing is said in the Sâṃkhya system of morality, and this want has "been supplied by its daughter-system, Buddhism, in the most admirable way,— "and in an impartial consideration we must not conceal the fact that the original "Sâṃkhya philosophy, which contributed much to the mental equipment of Indian "thinkers, must have played a certain part in the unfavorable development of the "Indian national character. Even in some passages of the text-books of the system "a morally pernicious influence is perceptible."

Professor Garbe presents the Sâṃkhya philosophy in uncolored objective exposition without criticism and without comparisons with similar ideas of European philosophy, and this method seems to be the proper one, because we must first have the facts clearly stated before we can use or apply them. By drawing parallels too soon we shall only be bewildered, and misunderstand the peculiarly Indian spirit of the various Indian thinkers.

Professor Garbe's book is divided into four parts. The Introduction contains four articles of general interest on the Sâṃkhya philosophy, its history and literature, its connexion with Greek philosophy, and a survey of the other philosophical systems of India. The second part characterises the Sâṃkhya philosophy. The name is derived from *sâṃkhya*, number, and is usually explained as a numeration-philosophy, that is, as a system of thought based upon exact distinction, measuring and counting. Professor Garbe considers this explanation as an after-thought, and believes that the name was originally a nickname invented by its enemies, the Brah-

mans, who intended to ridicule the method of numeration, for the Sâṃkhya philosophers show a special preference for reducing abstract concepts to dry enumeration. The world-conception of the Sâṃkhya philosophy is a consistent pessimism. All life is suffering, and the happiness which our experience appears to afford does not exist in reality. The worst suffering, however, consists in the necessity of a constant repetition of old age and death in every renewed existence. This is the nature of saṃsâra, of which we read (page 133):

"All living beings without distinction are suffering the pain produced by old "age and death. All are possessed of the worm, which is the fear of death, pre- "senting itself as the wish, 'may I not cease to exist, may I live,' and anything "which creates fear is pain; therefore, death is pain."

The aim of the Sâṃkhya school is a perfect annihilation of pain. Here the various methods of overcoming pain are refuted. The materialist hopes to free himself from bodily pain by medical treatment, from mental pain by all kinds of enjoyment, and protects himself against evil influences from supernatural sources by the use of magic. All these means are rejected by the Sâṃkhya philosophy as insufficient. They do not insure certainty, and afford only a transient relief. The Brahman religion offers sacrifices as the best means of escaping pain, and of attaining a place in heaven after death, where all pain will be at an end; but the Brahman receives the same answer as the materialist. His means are insufficient. Rituals are of no avail, and sacrifices are often impure, for they imply the shedding of blood; and the slaughter of animals involves us under all circumstances into guilt, which, according to the law of retaliation, will produce pain. Moreover, rich people can indulge in religious sacrifices, while poor people cannot. Thus, the poor are excluded from the methods of salvation offered by the materialist as well as the Brahman. No less vain are the hopes of the Yoga practice, to attain salvation by acquiring supernatural powers. Deliverance must not only free us from pain, but from its cause, and must make its return forever impossible. Now, since pain lasts only so long as the soul is in connexion with bodies and organs, salvation can obtain only if the migration of the soul is finished. And this goal, the absolute discontinuance of pain, can be reached only through philosophy, consisting in the discrimination between soul and matter.

Many constituent parts of the Sâṃkhya system are common to all other Indian philosophies. These are especially the ideas of saṃsâra and deliverance, which are treated on pages 172–184.

A peculiarly interesting feature of the Sâṃkhya philosophy is its pronounced atheism. While the existence of the national gods of India are not denied, the idea of a personal world-creator is most emphatically rejected. The mythological gods are not regarded as eternal beings, but as individuals who have their own karma and merit, who have originated and will pass away. There is probably a purpose in distinguishing between the devas, that is, the national gods of India and Içvara, the powerful, the Lord, meaning a personal world-creator. The belief in the former

is not interfered with, while the belief in the latter is rejected on physical, logical, and moral grounds. Sâṃkhya atheism is based, first, upon the doctrine that unconscious matter acts with intrinsic necessity according to the forces which it contains; secondly, upon the consideration of the law of karma which prescribes the course of the activity of living beings; and among other reasons we find, thirdly, that the problem of the origin of evil appears insolvable upon the assumption of theism. Professor Garbe quotes on pages 192-193 passages from the Kârikâ 57, and the Vijñânabhikshu, VI, 65, which do honor to the subtle thought of old Indian thinkers, and which will not be easily replied to even by our modern theologians.

The third part contains the doctrine of matter, consisting of chapters on cosmology, the reality of the phenomenal world, the attributes of matter or the three gunas, the evolution and reabsorption of the world, the concept of causality, the products of the fine and the crude elements. We need not mention that the old Sâṃkhya philosophers had not the slightest idea or correct knowledge of the physiology of the human organism. Their physiological knowledge is rather an *a priori* construction of what the organs of the soul might be than a real description of facts. The Sâṃkhya philosophy distinguishes between the *buddhi* or the reasoning organ, the *arhamkâra* or the ego-creator, the *manas*, or the internal sense. Besides these three there was the notion of an inner organ of unity. Besides the external senses there were thirteen organs which were supposed to hold an intermediate position between the purely psychic and bodily-sense-activity. The material body consists of crude matter, and is doomed to perdition at the moment of death. There is another, more sublimated body (not unlike the astral bodies of theosophists) which is supposed to survive death. This sublimated or inner body is supposed to accompany the soul in its transmigrations, and it, too, partakes of the *samskâras* or dispositions produced by merit and demerit. Every process impresses an analogous vestige into the soil of the thought-organ, and this vestige continues as a germ in the ground, and constitutes a disposition or *samskâra*, that is, a preparation or readiness for future reproduction of this process. These dispositions form in their illimitable mass an essential attribute of the thought-organ. The thought-organ is actually colored by them, so various are the innumerable dispositions which during the course of many births have acquired citizenship, usurping it according to the irrefragable natural law to which the individual is subject. These dispositions remain a constant property of the individual, conditioning the functions indispensable for physical life, the habits and talents which we, as we say, bring with us into the world, all of which are the heirloom of former births. They are impressions which in the meantime continue to exist and preserve their latent power, ready to manifest themselves whenever needed, like seeds which have been stored away for years, but as soon as brought into favorable conditions sprout with the same vigor as if they had just been harvested. We do not remember our past destiny of former births, as their impressions are without consequence in their present existence, and they can never be lost.

The last part is devoted to the doctrine of the soul which constitutes the dualism of the Sâṃkhya system.

Professor Barthélmy in his *Première mémoire*, pp. 449–450, does not understand how Kapila, according to the Sâṃkhya system, could retain the conception of the soul as perfectly inert, and here Professor Garbe replies that Kapila's soul-conception was invented to explain consciousness. The *buddhi* is said to be purely material, not less than bodies and other objects; it is also an object. The soul, however, produces the various attitudes of the inner organs by consciousness, by merely being near and throwing light upon their conditions. How much akin this view is to some modern conceptions of the soul, which insist upon the passivity of consciousness, need not be mentioned. Kapila's dualism of the distinctness of the soul leads him into the doctrine of the plurality of souls, which makes his system involved and naturally led to the criticism exercised by his successor, Buddha. Buddha went so far as to deny the existence of the âtman, considering the soul as the continuity of many mental acts, thus leading again to a monistic conception.

Deliverance could be attained only by a discontinuance of the effect of the objects upon the soul. Deliverance could not be conceived as a reabsorption of an individual soul into a divine soul, because, according to the Sâṃkhya system there is no God, and if a God existed, such a deliverance would be furnished solely because of the law that every combination leads to separation. Further, deliverance cannot be the annihilation either of the soul or of the world, because experience teaches that the aspiration of man seeking deliverance is not directed toward annihilation. All this is not deliverance. But what is deliverance? According to the explanation of Aniruddha it is an indescribable condition in which all pain is done away with, excluding the possibility of its return. But since pain is supposed to originate through the connexion of the soul with matter, deliverance consists in the perfect separation of both in a definite isolation of the soul. This separation means that any pain which affects the inner organ has ceased to throw its reflex upon the soul, or, to use another expression, that the organ affected by pain is no longer illuminated by the light of the soul, by consciousness. The soul continues in its state of deliverance as an individual being, but it exists in a state of absolute unconsciousness. Doubts as to the possibility of such a state are refuted by calling attention to such conditions as dreamless sleep, coma, or trance, in brief, all states in which consciousness disappears; the main difference between these states and deliverance being that they still contain the germ of being bound to material existence, which does not obtain in deliverance.

In the Introduction Professor Garbe puts forward a theory of the un-Vedic origin of the Sâṃkhya philosophy: not only because Kapila's doctrine was heretical and contradictory to the Vedas, and unknown in the Vedas, but also because none of its fundamental tenets are found in the Vedas. These tenets are the absolute disparity of the spiritual and material principles, the multiplicity of souls, the independence and eternity of matter, the view that matter consists of three constituents, the *sat-*

tvas, or goodness, the *rajas*, or badness, and the *tamas*, or indifference; the unfoldment of the world from primitive matter; the conception that first the psychical organs and then the outer objects originate; the trinity of the psychical organs, the twenty-five principles, the doctrine of the sublimate elements, and the inner body of the dispositions or saṃskaras; the conception of psychical processes as primarily purely mechanical, and only raised into consciousness by the spiritual power of the soul; the denial of the existence of God, and finally the proposition that deliverance is possible only by distinguishing spirit and matter. None of these ideas, Professor Garbe states, can be found in the Brâhmaṇas and in the Âraṇyakas. These, in brief, are his arguments to substantiate his claim of an un-Vedic origin of the Sâṃkhya philosophy. His arguments, however, do not appear to us sufficient, for how often do new ideas originate by contrast, by combination, or through the suggestion of the untenability of the prevalent ideas. Thus, Kant's philosophy has, as we most positively know, its roots in Wolf and Hume. Nevertheless, if we enumerate Kant's fundamental doctrines we shall find none of them in the works of those philosophers from the study of which he received the strongest impulse to their formation. Thus, in the face of the facts enumerated by Professor Garbe, we still regard a Vedic origin of the Sâṃkhya philosophy as possible, and if it were not so the mystery of its origin would be greater than before. For, not knowing at that time any higher civilisation than that of the Brahmans, how shall we account for the origin of this original and most independent philosophy of ancient India among those foreign invaders? Whatever be the truth regarding the home and origin of the Sâṃkhya philosophy, it remains the most thoughtful dualistic system of India, and, apart from shortcomings due to the lack of natural science, perhaps of the whole world. The present volume is unquestionably a very scholarly and reliable exposition, and, as such, an indispensable handbook for students of Indian lore, and especially for those who are interested in the origin and development of Buddhism. κρς.

RELIGION INNERHALB DER GRENZEN DER HUMANITÄT. Ein Kapitel zur Grundlegung der Sozialpädagogik. By *Paul Natorp*. Freiburg and Leipsic: F. E. B. Mohr. 1894. Pp. 119.

The title of this booklet is apparently modelled after that of Kant's *Religion innerhalb der Grenzen der reinen Vernunft*. Prof. Natorp, accordingly, has the same enemies to contend with as did the sage of Königsberg; on the one side those to whom religion is higher than all understanding, and on the other hand those to whom humanity is too high an ideal to be identified with religion—an extramundane Utopia. The author states in the Preface that it is his proposition to conciliate both antagonists, trusting that religion should be applied to practical life, especially to the social problem. A radical question demands a radical answer; in a word, it demands a scientific method. The Open Court Publishing Company was founded for the purpose of establishing the Religion of Science, and so of reconciling religion with science by applying the religious enthusiasm to the practical problems of life and

solving its theoretical problems by the method of scientific inquiry. Therefore, we need not say that the enterprise of Professor Natorp finds our full sympathy, and we hope that his work will prove good seed bringing forth in time much fruit.

Like Kant, Professor Natorp contends that the laying of the religious conflict cannot be decided by an appeal to traditional authority or to sentiments and pious instincts. The *is* and the *ought* are in conflict, but our sentiment imperatively demands a solution of the conflict. It would be sad if there were an impervious abyss between willing and doing, between duty and action. We must have the faith for achieving that which is required. By faith Professor Natorp understands not the vague idea of belief, but staunch confidence, the firm trust that this demand is for every man, to a certain degree at least, realisable. Accordingly, he proposes to raise all mankind to the height of humanity, to educate the people, that is, the mass of the laboring classes, to the highest attainable stage of a scientific, moral and æsthetic civilisation, in the consciousness of their social relations, or, as our author expresses it *in Gemeinschaft, durch Gemeinschaft, als Gemeinschaft.* His religion will not be dogmatical, but an aspiration to attain the ideal of humanity. The ideal of humanity to be recognised by a more and more complete investigation of the truth. He says on page 105:

"Often it has been said that a non-dogmatic religious investigation is impos-
"sible, but I do not know on what grounds. The child takes the religious tales
"simply as history, not in a scientific but in a naïve sense. He is first kept busy in
"acquiring its contents and has no time to reflect whether the events really took
"place and are to be understood literally. Supposing that everything is clear and
"natural—the child-imaginations of mankind are always comprehensible and vivid
"to a child's imagination—supposing again, that the moral is not crude and of-
"fensively intrusive, but steals into the soul on the quiet and sure path of imagi-
"nation and sentiment without provoking reflexions: the question will not rise at
"once, Is the story true indeed, or is it only a beautiful fairy tale? Should, how-
"ever, the question arise,—and certainly the stage will come where a child will
"either propose it himself or in case it be proposed understand its deep importance
"—then let the teacher say clearly and definitely: it has been handed down thus by
"tradition and received *bona fide.* Many thousands have been convinced and find
"happiness in this conviction; perhaps the teacher himself, but he ought to add there
"are many faithful people who are not thus convinced. No doctrine concerning
"these things has any right to demand of you the conviction that it is literally true.
"You will have to decide independently for yourself as soon as you have learned
"many more things whether or not you will accept it. Then, however, as the main
"thing the teacher should reveal the great moral truth which is contained in the
"story, and should make it as impressive as possible. There are a great number of
"educators, and they not the worst, who would be happy to be allowed to teach re-
"ligion in this way."

Professor Natorp proposes this method not for the higher schools or universi-

ties, but for the schools of the people, of the children of laborers. He demands, first, history of religion, expounded in a strictly objective way, as all history ought to be treated, and then an explanation of the foundations of religion which are given in the nature of man, in the laws of his consciousness of his moral and social being. It will produce an unprejudiced appreciation of religion as one of the most potent factors in the education of mankind. This method would resume, as says Professor Natorp (page 107), the good traditions of the German *Aufklärung*, which should never have been abandoned. Prof. Natorp's work unites with high ideals of reform, the conservatism of the serious philosophical inquirer. KOÇ.

THE APOLOGY AND ACTS OF APOLLONIUS AND OTHER MONUMENTS OF EARLY CHRISTIANITY. Edited with a General Preface, Introductions, Notes, etc., by *F. C. Conybeare*, M.A., Late Fellow of University College, Oxford. London: Swan Sonnenschein & Co. New York: Macmillan & Co. 1894. Pp. 360. Price $3.50.

The Acts which form the contents of this work are translations of ancient Armenian texts selected from a repertory of martyrdoms published at the Armenian monastery of San Lazaro, in Venice, in the year 1874. It is their object to give the reader, "in a succession of vivid pictures or glimpses, an insight into the practical working of Christianity during the first three centuries of its history." It is known that the documents of early Christianity were continually being altered and recast to suit every fresh development or change in the views of the orthodox and heretical believers. Such changes were made regularly in the Latin, Greek, and Syriac versions, but not so much so in the Armenian versions, which accordingly often give us access to a more primitive form of Christian writing than has survived in Greek, Syriac, or Latin.

Highly interesting is the knowledge these Acts afford us of the character of early Christianity. All relate to martyrdoms. We must not suppose that the highest temper of the new religion was displayed there, but must expect simply a life-picture of the times, sketches of the battle for freedom of individual conscience and private judgment as opposed to the tyranny of a despotic government and the superstitions of the people. We see here clearly, also, the attitude of the government to the new sect. "From the time of Domitian, if not at a still earlier date," says Mr. Conybeare, "the very name of Christian exposed a person to the penalty of death." We also get a glimpse of the pagan elements which still survive in the conceptions of the converts. Nothing could be more untrue than to suppose that conversion to the religion of Christ signified and brought with it a disbelief in the gods of paganism. "A convert continued to believe in the gods as firmly as before; the only difference was that he now came to regard them not as benevolent beings but as malevolent ones. They were the fallen angels, ministers of Satan, lying in wait to destroy men, and often for that end taking up their abode in and disguising their natural foulness

under the most beautiful statues." Even in Justin Martyr, and in Augustine we meet with these views, and we are not astonished, therefore, to find that the Christian saints resorted to exorcism against the gods of the heathen. Further, this view led to iconoclasm, another general characteristic of the early Christians. "The obvi-"ous way of scotching a foul demon was to smash his idols; and we find that an "enormous number of martyrs earned their crown in this manner, especially in the "third century, when their rapidly increasing numbers rendered them bolder and "more ready to make a display of their intolerance. . . . The most popular of the "saints were those who had resorted to such violence and earned their death by it; "and as soon as Christianity fairly got the upper hand in the fourth century, the "wrecking of temples and the smashing of the idols of the demons became a most "popular amusement with which to grace a Christian festival. As we turn over "the pages of the martyrologies, we wonder that any ancient statues at all escaped "those senseless outbursts of zealotry."

We find also in many of these martyrdoms that the creeds of the saints are simpler than in the third century Acts, showing a distinct growth of doctrine; and also, contrary to the professions of many modern divines, that all the saints believed in the eternal fires of hell,—a belief which Christianity took over from paganism. Without the dread of death and the belief in the eternal fire of hell which pervaded the minds of all the ancient peoples, it is probable that Christianity would not have made much advance towards the conquest of men's minds.

Interesting is it also to note how the ancient myths remained gathered around the early saints. Callistratus is borne to the shore by dolphins like Amphion, and saints innumerable began their careers by destroying a dragon like Perseus, or like Hercules a voracious lion, or like Theseus a destructive bull. "A rich harvest awaits any student of folk-lore who approaches the legends of the saints from this point of view." It is also to be stated that the early Christians did not renounce the world as much as is usually supposed from some classical examples of detachment from mundane interests. We find, too, that the asceticism of the earliest followers of Jesus and Paul was due to the conviction that the end of the world was at hand; the millennium belief still survived in some remote regions, as in Syria and in Pontus. We see, thus, that Jesus's repudiation of marriage like the companion precept to possess no riches, was originally meant to prepare men for the kingdom of heaven which was at hand, and we discover why it is that the belief in the superior holiness of virgins survives in the church.

Such are a few of the inferences concerning early Christianity that may be drawn from this work. Of all the Apocrypha here translated, the most beautiful is the Acts of Paul and Thekla, which are full of humane touches. But every one of the Acts of this collection is well worth reading by persons who have the least interest in this subject. It is unnecessary to say that Mr. Conybeare's translation is forcible and idiomatic.

μκρκ.

MATTER, ETHER, AND MOTION. The Factors and Relations of Physical Science. By *A. E. Dolbear*, Ph. D., Professor of Physics, Tufts College. Boston: Lee and Shepard. 1894. Pp. 407. Price, $2.00.

The English-speaking world has little reason to complain of a dearth of popular treatises of science. To speak only of physics, nearly every master of that science has left some splendid and comforting memorial that the verified truths and accredited hypotheses of science, however dim or abstruse their origin, can, at some period of their development, be stated in plain and simple terms and be made intelligible to clear and unbiassed minds of all professions. Yet the example, the classical ideal, set by men like Faraday, is not always followed—not completely followed even by men of Faraday's approximate intellectual stature, and infinitely less so by spirits of a more subaltern cast. Addressing an audience in the main credulous, and prepared by long mistraining to expect and to accept only marvellous revelations, the popular expositor of science is exposed to temptations which yielded to, fully justify the stigma that cleaves to the literal English rendering of his title's French equivalent—the *vulgariser*. Frequently, a novelty, which discharges no function in the method or in the practise of science, is exalted to the dignity of a principle and treated with the impressive particularity which properly belongs only to important truths. Science, like society, has its fads. But the scientist, whose mental anchor does not drag, is perfectly aware that these erratic strayings of his thoughts do not constitute the serious business of his profession, and when he indulges in such cerebral antics, he usually does so with a consciousness and underplay of humor which from his point of view fully excuses him. But with the uninitiated, trustful public it is different. Here the mental excursions of the physicist only astound and mystify, and, being accepted as truths, convey an entirely wrong impression of what science is, and scarcely any of what it accomplishes.

Of no epoch of scientific development is this more true than of the present. Great as the advance of science has been in the last fifty years, so great indeed that with some liberty of expression the epithet "revolutionary" may seem justly applied to it, it is yet an exaggeration to say, with Professor Dolbear, that more *knowledge* has been acquired in this time than in all the preceding centuries (p. 384). In scientific freaks it does stand above all the preceding centuries, but, with the exception of three or four ideas, (which had their root in earlier thought,) the science of the epoch indicated is distinguished from that of the two preceding centuries by nothing more remarkable than an increased zeal in the domain of plodding specialised research. When the time for its criticism comes, it will not be said that the knowledge thus acquired "is in the nature of a catastrophe where old continents have sunk and new ones have arisen from ocean beds."

But enough of retrospect. The text-books have not kept pace with this revolutionary advance of science, and Professor Dolbear's book is written to meet the wants of a large body of persons who desire to know the contemporary state of natural philosophy and who have neither the time nor opportunity to read and digest

the thousands of monographs which record that advance. Really, the book is more than this. In a clear, smooth style, Professor Dolbear expounds the scope and import of the chief ideas of modern physics, as they take shape in his philosophy, and from his expositions the critical reader will derive much profit and stimulus. If he has not solved all his problems, he at least leaves the most of them in a shape which will make their solution easier for others. And this is much. More difficult than the solution, often, is the proper formulation of a problem. For, properly formulated, a problem sometimes turns out not to be a problem, and its solution is accordingly dispensed with.

Leaving aside the solid kernel of the work, we shall now simply advert to a few points on which Professor Dolbear's views may be criticised, first affixing here the titles of the chapters of the book, which are: "Matter and Its Properties," "The Ether," "Motion," "Energy," "Gravitation," "Heat," "Ether Waves," "Electricity," "Chemism," "Sound," "Life," "Physical Fields," "On Machines and Mechanism," "Properties of Matter as Modes of Motion," "Implications of Physical Phenomena," "Relations of Physical and Psychical Phenomena."

Professor Dolbear accepts *in toto* the mechanical view of the universe. First, all *physical* phenomena are reducible to the principles of mechanics, and atoms and molecules are subject to them as much as masses of visible magnitude; however different one phenomenon is from another the factors of both are the same—*matter, ether, motion.* "The visible universe may be conceived as a vast machine within which motions are being exchanged by contact and radiation." Matter is defined generally as anything which possesses the property of gravitative attraction. The existence of an ether is supposed, not asserting gravitative action, and hence different from matter, but in all probability *by some kind of a vortex motion* making up matter. As to gravity, there can be little doubt that the ether is concerned in it. "One cannot but see that it [the ether] is a storehouse of an almost unlimited "amount of energy of many kinds; so that if every particle of matter were in- "stantly annihilated, there would still be a universe filled with energy, though it "would not be serviceable, because lacking the conditions for transformation into "useful forms. This may be said to be one of the functions of matter—the trans- "formation of the energy it gets from the ether." Second, as to *vital* phenomena Professor Dolbear accepts the theory, which has the weighty advocacy of Haeckel and nearly all great naturalists, that the ultimate explanation of all biological phenomena must be mechanical. "It is clear," he says, "that the solution of every "ultimate question in biology is to be found only in physics, for it is the province "of physics to discover the antecedents as well as the consequents of all modes of "motion."

It is hard to go behind a mechanical explanation of vital phenomena, more so behind a mechanical explanation of physical phenomena. But although the opponents of the latter are few and isolated, the opponents of the former are not; and such passages as the following, supported though they are by eminent authorities, give a

wrong impression: "What seemed probable forty years ago, to those who were "conversant with the facts,—that vital force as an entity has no existence, and that "all physiological phenomena whatever can be accounted for without going beyond "the bounds of physical and chemical science,—has to-day become the general con- "clusion of all students of vital phenomena; and vital force as an entity has no ad- "vocates in the present generation of biologists. The term has completely disap- "peared from the science, and is only to be found in historical works." Applied to the old vitalism, this statement is true. But it overlooks a strong and important movement in biology and philosophy, which wrong or right, reactionary or progressive, still exists and even employs the name of vitalism. It is represented (in the scientific field) by Hanstein, Marilaun, Rindfleisch, and less mystically by Bunge and Binet. (See Max Verworn's article "Modern Physiology," *The Monist*, Vol. IV, No. 3, and the preface to A. Binet's *Psychic Life of Micro-Organisms*.)

We will next mention some of the implications of the new physical hypotheses in the inanimate field, and seize the opportunity of seeing how an hypothesis can throw light upon itself. According to Professor Dolbear we have in natural phenomena matter, and ether, and space, and time, and motion. "If matter and "ether be substances, then the product of one into the other would signify nothing; "it would be physical nonsense. So likewise would be the product of matter into "space or time; and yet if matter is to be possessed of energy, and motion is *not* "one of the factors, then either space or time must be, and no one can imagine "how energy can in any way depend upon time as a factor, and there is no degree "of probability that it is or can be so; and hence, though we had no hint of how it "might be, one would need to avow his belief that in some way motion was involved "in every case where physical energy was involved, for in any case where it had "been hitherto possible to trace it, it had been found to be present as a factor in "precisely the same relations as in all other known cases, and hence he would avow "a disbelief in the existence of potential energy in any other than a loose sense for "a condition where the character of the motion involved was obscure. This would "imply that all energy is kinetic, whether the character of the motion was deter- "mined or not. This view is now held by those who have taken the pains to think "out the necessary relations that are involved in this subject." It follows from this that potential energy must in some way depend upon motion (Tait). And, in another place, the conclusion is stated that *inertia, too, must be looked upon as probably due to motion.*

Again, since at absolute zero there is no cohesion, *hardness* cannot be a property of atoms; from another property of the absolute zero, *color* cannot be affirmed of atoms. "*An atom is a particular form of motion of the ether in the ether.*" Impenetrability is an unwarrantable assumption. Even "such differences between "*the atoms of the elements as are called their masses, are due to the relative rates* "*of rotation* [of ether within the ether]." The world is reducible to motion and ether, and by this explanation is rendered more mysterious than it was without the

explanation. "The mystery of phenomena is not lessened but made greater by the "discovery that everything which affects our senses in every degree is finally re-"solvable into a substance having physical properties so utterly unlike the proper-"ties of what we call matter, that it is a misuse of terms to call it matter."

When we reason from facts to facts, even such as are beyond the range of experience, we are pursuing science; when we reason from *assumptions* to facts beyond the reach of experience, we are pursuing metaphysics. Much of the new physical ontology suffers by this error. We should never forget that in following out to their logical conclusions the implications of the assumptions made or suggested by science regarding atoms and ethers and molecules, we are extending conceptions which are not based upon facts, and which are not always subject to experimental control; that we may be applying such assumptions to cases to which they do not belong, and so be doing in physics what the ontologists did in philosophy when they sought to deduce the world from the notion of Being, Non-Being, etc., etc.

With respect to the "absolute scale of temperature," this is simply a scale reckoned from a supposed point, where the tension of a gas is zero. If without the limits of experience things were the same as they are within those limits, that point would be —273° Celsius. But, useful and convenient as this scale is as a scientific tool, it does not follow from it that a temperature-point is producible at which the tension of a gas is equal to zero, nor that a lower degree of temperature is impossible. Consequently, to accept that scale as absolute, in the absolute sense, and to juggle out of it the properties of matter, of atoms, or of ether, is logically inadmissible.

Professor Dolbear lays considerable stress upon his treatment of "physical fields"—all analogies of fields of force. We shall mention only one point here, which will reveal the author's attitude to the revelations of the new psychical sciences. As there is a magnetic field, an electrical field, a thermal field, etc., so, Professor Dolbear asserts, (on the ground of phenomena of sympathy,) there is a *brain-field*. His idea seems to be that there is such a thing as cerebral induction. Still, "this is not to be understood as asserting that . . . . thought-transference "actually occurs. All that is asserted is that the physical conditions necessary for "such transference actually exist, and one who was acquainted with the properties "of physical fields would certainly predict the possibility of thought-transference "in certain cases."

In the two last chapters of the book Professor Dolbear puts some very hard questions to the spiritualists. But he is lenient, after all, to their aspirations. We shall close therefore with a quotation which will show his attitude towards the momentous questions of modern "psychics": "No one may assume for an instant "that the possibilities of ether phenomena are limited by such interactions as have "hitherto found expression in treatises on physics. Indeed, there is already a body "of evidence which cannot safely be ignored, that physical phenomena sometimes

"take place when all the ordinary physical antecedents are absent, when bodies "move without touch or electric or magnetic agencies,—movements which are "orderly, and more or less subject to volition. In addition to this is still other evi- "dence of competent critical observers that the subject-matter of thought is directly "transferable from one mind to another. Such things are now well vouched for, "and those who have not chanced to be a witness have no *a priori* right from phys- "ics or philosophy to deny such statements. Such facts do not in any way invali- "date physical laws, nor make it needful to modify present statements concerning "energy. Physical laws are not compulsory; they *rule* nothing; they are but state- "ments of our more or less uniform experience. If these things be true, they are "of more importance to philosophy than the whole body of physical knowledge we "now have, and of vast importance to humanity; for it gives to religion corrobo- "rative testimony of the real existence of possibilities for which it has always con- "tended. The antecedent improbabilities of such occurrences as have been called "miracles, which were very great because they were plainly incompatible with the "commonly held theory of matter and its forces, have been removed, and their "antecedent probabilities greatly strengthened by this new knowledge; and reli- "gion will soon be able to be aggressive with a new weapon." T. J. McC.

THE HISTORY OF TRADE UNIONISM. By *Sidney* and *Beatrice Webb*. London: Longmans. 1894. Pp. 558. Price, $5.00.

The bulk and broad title of this work sharpen an expectation of more than it actually presents. It does not give a history of Trade Unionism generally, but of *English* Trade Unionism particularly. It does not afford a complete picture of the origin or growth or organisation or activity of any one of the great Trade Unions of Great Britain, but confines itself rather to a history of the general movement of those combinations. Neither is it critical: "all analysis of the economic effects of trade union action is reserved for a subsequent volume on the Problems of Trade Unionism"; and then,—so the authors, with probably a consciousness of omission promise us,—the annals of the separate unions will be more fully drawn upon.

The vivacity of thought and action, characteristic of European civilisation during the eighteenth century, was especially marked in economic affairs. Invention grew apace; the industry of the gilds was felt to be cramped and the modern factory system gradually asserted itself,—at first slowly, but at length toward the close of the last century with crushing strength. Instead of an industrial organisation in which the humble apprentice might reasonably hope, albeit by slow stages, yet surely to attain to a mastership, with its concomitant possession of raw materials, of means of production, of security against over-hot competition, of placid enjoyment of the fruits of industry, in short of *otium cum dignitate*,—industry assumed a new form in which the toilers remained, their life long, hopeless toilers, and the masters were such, not by reason of long service and preparation, but of *capital!*

Instead of the long-existing *vertical* cleavage of industrial society, there was soon observed the *horizontal* cleavage with which alone we are acquainted.

In England, the industrial disturbances peculiar to the gild-age were well met and controlled by the "Elizabethan Laws"; and with these, existing for many decades after the modern revolution had begun its stealthy progress, it was sought to confront the bewildering succession of strikes, crimes, riots, which, inexplicably, grew with the increasing productiveness of human exertion.

The workmen saw in these ancient laws a protection against the factory, for by them the proportion of apprentices was limited and laborers forbidden who had not served long years of preliminary training.

The new class of employers, banding themselves and throwing their united force against such barriers to the gigantic wealth-bringing exploitation of labor and capital opened to them by the new methods of manufacture, found in the old enactments a powerful weapon of offence: the rigorous provisions against combinations and strikes, which former well-meaning legislatures had built up, thinking that they had themselves for all time satisfactorily regulated the relations of industry and therefore rendered any measures of self-help on the part of men or masters superfluous and in a way rebellious.

Here is the field for which the now hostile divisions of industry have ever since been contending. By the former class of provisions, the laborer's standard of life was legally maintained. By the anti-combination enactments, the law-giving power had sought to prevent the numerically strong workers from pushing their vantage too far, to the ruin of the masters and to the menace of public peace and prosperity.

At the outset of this revolution of industry, the masters had peculiar auxiliaries. At the close of the eighteenth century the industrial dissensions had become really alarming; and the horrible events of the French Revolution materially assisted the employers in obtaining the Anti-Combination Laws of 1799, by which all combinations of workingmen but the ancient friendly societies became at once criminal and subject to the full force of the State. The individualistic theories of the new science of political economy, again, afforded agreeable catchwords, by means of which these laws were kept on the statute books over a quarter of a century, in the face of a most steadfast struggle for their abrogation.

Again, the wealthy and schooled employers were capable of quick and powerful organisation; the men were slow and weak from ignorance, their numbers, the exaction of family wants.

And, after all, the enactments which the men sought to maintain were antiquated; they failed to meet the new conditions so as to protect the workers, and if executed they would have stood in the way of the nation's industrial supremacy.

Thus, in the first vicious struggles, the men were completely vanquished; the working classes of Great Britain were plunged into the depths of animalism, perhaps more deeply than those of any other commonwealth undergoing the same great change to modern industry.

Such is the state of affairs about 1825–1830.

The old gild organisation maintained itself to some degree among a few of the trades less subject to the innovations of machinery. To their old trade clubs of journeymen, led by the indefatigable Francis Place, it is to be ascribed that the Combination Laws were in 1825 repealed.

But the workers in the trades where the factory system had developed itself, being sunk to that low level of intelligence that they committed violence upon factories and machines as their arch-enemies, were lifted to self-management by members of the upper classes. These were the textile-workers and their kindred. Later, too, the mine-workers. Appalled by the misery of these, their fellow-citizens, philanthropists organised them to agitate for legislation to control the conditions of employment; and in this way was the great code of English factory legislation slowly developed.

Thus there grew up a dual movement in English trade unionism, observable down to the present day: *The first*, that of the trade clubs, friendly societies, trade unions proper, restricted to one trade or group of kindred trades, apparently having for their main object so-called mutual benefits, and only for a secondary the social and political agitation for the legal emancipation and improvement of their society, holding fast to the idea of independent collective bargaining by the organised trade with the employers, and contemning the help of legislation for favorable conditions of employment. *The second*, that of organisations, more transitory but often of vast power in the State, which directly agitate for the assistance of Parliament for the regulation of employment, thus sanctioning the latter with the solemnity of the public will.

It is the former movement on which this work lays particular stress; rather too much neglecting the latter. Though incompletely, it contains a mass of new information on various features of the growth, organisation, and policy of the friendly societies and trades unions, their periodic efforts at national all-trades-embracing amalgamation, their trades councils, trades union congresses, and Parliamentary committees. It portrays briefly and well the leading figures in the trades-union movement. It indicates more fully than any other the different economic ideas which have swayed the movement at various periods. It points out the practical results, economical, political, and social, accomplished by the unions, delineates with considerable skill the spirit of aristocracy manifested by the rich old trade unions toward their humbler unorganised fellows, like the dockers and the miners, and the "New Unionism" which has now obtained the mastery, and affords to us the key to the state of transition characteristic of English trades unionism to-day.

A final chapter presents a very valuable census of trades unionism as it exists in England in the years 1892–1894. And at its close we find an excellent bibliography, which it is left to some other author to utilise for a completer and more cosmopolitan history of trade unionism.

O. W. Weyer.

PSYCHOLOGIE DES GRANDS CALCULATEURS ET JOUEURS D'ÉCHECS. By *Alfred Binet*. Paris: Hachette & Co. 1894. Pp. 364.

For several years M. Binet has been making experimental researches on the different forms of memory with the idea of producing something useful to pedagogy. The present work in which the partial results of his studies are published is divided into two parts, the first of which treats of the great mental arithmeticians and their work, and the second of the psychology of chess-players, especially of blindfold players After a brief historical *résumé* of the subject of arithmetical prodigies, M. Binet takes up the case of Jacques Inaudi, a renowned mental calulator born in 1867, now giving public exhibitions in France. It is impossible with our limited space to give a full account of the data recorded by M. Binet. We shall limit ourselves to a few results which he claims as new.

The case of M. Inaudi, M. Binet claims, furnishes us with a fresh contribution to the theory of partial memories. In M. Inaudi, as in all arithmetical prodigies, the memory for figures is abnormally developed, the other memories not. But exactly here an important distinction is established by M. Binet's researches; the distinction, namely, of the *acquisitive* power of memory and of the *extent* of memory. The acquisitive power of memory refers to the maximum number of figures that can be repeated after a *single* hearing; the extent of memory to the number of figures that can be preserved in the memory after *several* hearings. Although M. Inaudi after several hearings could retain in his memory three hundred figures and with great effort four hundred, yet he could only repeat forty-two from having the figures read once. M. Inaudi is a perfect type of auditive memory. In his memory of figures he does not use number-forms or visual imagery of any kind; he remembers figures principally by their sounds. M. Inaudi's methods of calculation are original, and slightly different from the traditional methods. In subtraction he begins at the left, always operating with groups of three figures. His fundamental method is multiplication. To divide and to extract roots he multiplies, which for mental calculations, if one knows that whole numbers are required, is certainly the easiest course and that universally employed by good arithmeticians. In performing multiplications he breaks up his multipliers and multiplicands into lesser numbers, and after performing the resultant simpler multiplications adds the results. For example, to multiply 325 by 638 he multiplies 300 and 25 each by 600, by 30, and by 8, adding the totals. The problems which M. Inaudi solves are of the stereotyped class. The most difficult are of this order. Find four squares the sum of which is 13,411. M. Inaudi gave his first solution in three minutes, his second a minute after the first, and shortly after that a third solution. The secret of M. Inaudi's performances consists chiefly in his wonderful partial memory for figures, and not in any exceptional mathematical power. Comparative experiments were made with the professional accountants of the Bon Marché with the result that M. Inaudi is not more rapid in simpler computations than the professional accountants, but only in the larger ones which require a great span of memory.

The case of M. Diamandi, a second calculator, offers nothing remarkable; his type is the visual type; he performs multiplications by memory of position. In two chapters which conclude this part of the book M. Binet gives us an interesting discussion of visual and auditive memory, as also of "the simulation of memory" or apparent memory. With respect to this last his conclusion is that no importance is to be attached to the number of figures which a person retains at any given moment in his memory and which he can repeat without error; a person versed in mnemotechny can recite and repeat an indefinite number of figures, as also learn and repeat an indefinite number of figures recited to him. From a review of their family histories, early condition, and environment, M. Binet concludes that arithmetical prodigies form a true natural group, the distinctive characteristics of which are as follows: no hereditary influence, nor influence of environment; low birth; abnormal precocity; the aptitude for computation manifests itself in the child when still illiterate; the absorption of the whole mind by figures; and finally the aptitude in question is developed by exercise and diminishes rapidly by disuse.

The discussions and experiments relating to chess-playing generally and to blindfold chess in particular, are full of information, though the results are what one would naturally expect. Three elements are predominant in blindfold chess: erudition, memory, and imagination. The significance of erudition is evident. The memory referred to is the memory of recapitulation; the going over of old plays and the forecasting of new ones. The imagination referred to would be called in technical psychology "visualisation" and refers to images of fixed positions and of possible movements. These images M. Binet calls visual geometrical images, and claims to have described for the first time this special form of the visual memory. μ.

AUGUST COMTE ET HERBERT SPENCER. Contribution à l'histoire des idées philosophiques au XIX. siècle. By *E. de Roberty*. Paris: Félix Alcan. Pp., 200. Price, 2 frs. 50.

In that great flux of ideas and systems, the aim of which is to fix beliefs and convictions, says M. Roberty, two great conflicting movements have existed from time out of mind: monism and agnosticism. In the infancy of philosophy this conflict was normal. To-day it presents certain pathological aspects. The spirit of synthesis has exhausted itself in attempts to blend and reconcile these opposing views, but in vain. The philosophy of the nineteenth century follows in the beaten paths of the metaphysics which preceded it,—a metaphysics modelled upon the monotheistic traditions of the higher religions. It unites, unconsciously and irrationally, the quest for unity with the old inherent dualism of knowledge, reviving the most dangerous and disgraceful of fallacies.

In previous works of his, *L'agnosticisme* and *La recherche de l'unité*, both mentioned in *The Monist*, M. Roberty has pointed out some characteristic features of this fundamental antinomy of human thought. The very effort after a universal

synthesis militates against agnosticism. We break the elementary laws of logic in conjoining a theory which affirms the ultimate unity of things with one which asserts our inability to scrutinise the impenetrable depths of nature. We fall into the error of taking the negation of unity, of pure abstract knowledge, the Unknowable, for something distinct from the phenomenal world. In this light, according to M. Roberty, philosophers may be grouped into two great classes. In the one are found Democritus, Bruno, Spinoza, Leibnitz, Fichte, Hegel, Schopenhauer, and Spencer, who sought to correct agnosticism by monism; in the other are found Socrates, Aristotle, Bacon, Descartes, Locke, Hume, Kant, and Comte, whose monism is accompanied with an agnosticism which is logically less defective. For his present study, as best calculated to elucidate the tendencies of modern thought, M. Roberty chooses the two last of these philosophers.

Three powerful intellectual currents are introduced with August Comte, three grand directive ideas were disengaged from his philosophy. They are (1) the *agnostic* current, the greatest and most violent, or the idea of *limit*; (2) the *historical* current, or the idea of *evolution*; (3) the *monistic* current, or the idea of "cerebral unity." "Why now," asks M. Roberty, "or rather, how, did the thought of this obscure teacher of mathematics, August Comte, come to dominate a whole century? For two reasons. First, it pretended to combine in one dogmatic bundle two implicitly contradictory tendencies, while to all appearances it resolved one of the oldest and most obstinate of the antinomies of the mind; secondly, August Comte was, above all, a *populariser of genius*. He democratised philosophy. By positivism, philosophy, serious philosophy, was brought, for the first time, within the range of the great mass of minds.

"The scientist for whom the notion of *degree* possesses real importance, should "beware of prematurely reducing the organism to a mechanism, and *vice versa*. "But the philosopher in identifying like concepts should never forget that his gen- "eralisations pursue a purely logical end. Philosophical causality, general or uni- "versal causality, by rights should be neither mechanical nor organic. In the first "case, the thinker will become implicated in the contradictions of materialism; in "the second, will fall a prey to the illusions of teleology. August Comte escaped "neither of these pit-falls."

With respect to Mr. Spencer's endeavors to derive multiplicity from unity, life from death, movement from rest, etc., M. Roberty says that the same conclusion as that in which this great philosopher sums up his researches is to be found among all the early thinkers under the form of the law of causality, or under that of the principle of logical identity.

The thesis, as we see, which M. Roberty chiefly wishes to establish is, that the *substratum* or substance of the universal conceptions of the past, theological as well as metaphysical, may, in a last analysis, be reduced to three great dogmas: agnosticism, evolutionism, and monism; that each plays a different part according to the epoch, and especially according to the state of advancement of the positive sciences.

M. Roberty has added a postscript to his book, on the relations of monism to reality, and announces that he is at work upon an ethical treatise which will appear within a year, entitled *La déception du bien et l'immoralité future.* μ.

ASPECTS OF PESSIMISM. By *R. M. Wenley*, Lecturer on Philosophy in Queen Margaret College, Glasgow. Edinburgh and London: William Blackwood & Sons. 1894. Pp. 337.

The six essays which constitute this work have for their titles: "Jewish Pessimism"; "Mediæval Mysticism"; "Hamlet"; The Pessimistic Element in Goethe;" "Berkeley, Kant, and Schopenhauer"; and "Pessimism as a System." The author has contemplated for some time an exhaustive work on Pessimism, but preoccupation of various kinds has prevented him from carrying out his plan. His hope is, therefore, that the two technical essays of this collection, the two last, will be regarded as suggestive rather than as final. "They represent preparatory inquiries, not concluding deliverances." In them, however, will be found the author's views of his subject.

"Monism," he says, "in some form or another, is doubtless the goal of mod-"ern thought. But it has already been tried, and its results have proved suffi-"ciently disastrous. Why, then, do we tend to adopt it? It is to be borne in "mind, with Berkeley, that whatever our theories or methods, the problem of phi-"losophy is the Absolute. To see all things in relation to God, and as connected "with what may be provisionally called God's moral government of the universe, "is the ideal. There is a large measure of faith in philosophising. For, al-"though many questions defy our best efforts, and although the attempted rebuild-"ing of the universe to our own souls is always inadequate, the very fact that the "problems exist, and the very truth that there is a universe—not a chaos—irresist-"ibly brings home certain convictions. Taking life at its highest worth for me as "a person, accepting the 'music of the spheres' as musical for me, I must invari-"ably, if in the widest sense, declare, *Credo ut intelligam.* . . . So intimately is this faith bound up with speculation, that it may be dogmatically said, if a man be 'uncertain about God he cannot be sure about anything. Psychology itself, in so "far as it forms the necessary prelude to philosophical investigation, bears witness "to this. For it implies not simply self-reflexion and experiment upon the bodily "organism, but also appreciation of the past, belief in what mental activity has "already accomplished. It presupposes, that is, an order ruled by mind, which is "not of individual creation; nay, in such an order is the pledge of its existence no "less than the voucher for its value."

"Startling as the utterances of modern pessimism may appear," we read again, "they are no products of capricious self-dissatisfaction. They do not necessarily "bear witness to broken ideals, to adverse fortunes, or to embittered lives. They "are rather the results of matured reflexion on the graver problems of metaphys-"ics, ethics, and religion."

Yet as a *correct philosophy* how does pessimism stand? In its Schopenhauerian shape "it conforms to scarcely one of the requirements of a monistic theory; and "this is the more certain, that it has been repudiated in essentials by later sympa- "thisers. Suicide by metaphysics is the end which it proposes to man; it is itself "a metaphysical *felo de se*, and as such may be taken either for dead or unaccount- "able."

In Hartmann, whom he considers as Schopenhauer's equal, and in some respects his superior, the author finds five chief defects: (1) the insufficiency of the Unconscious as a principle of monism; (2) the metaphysical absurdity of pessimism; (3) its basing its moral theory upon a teleological view of the world; (4) that neither pleasure nor pain is the criterion of the moral worth of a life; and (5) the inadequacy of the theory as a philosophy of religion.

The author concludes: "The cumulative action of morality, having for chiefest "illustration the influence of Jesus, is a standing fact which neither Pessimism nor "Eudæmonism can compass. The real sacrifice of the whole man to what heart "and head recognise as the good character can neither be surmounted by Pessimism "nor grounded on Hedonism. Far rather, personal devotion to the perfecting of a "society, which includes self, transcends the painful half-truth of Pessimism and "the derogatory untruth of Sensationalism. For, the destruction of sin is to be "accomplished neither by the cessation of pain nor by the positive satisfaction of "sense, but by that active purifying of heart which, be theories what they may, "constitutes man's single means of communion with God." μ.

ETHICS OF CITIZENSHIP. By *John Maccunn*, M. A., Professor of Philosophy in University College, Liverpool. New York: Macmillan & Co. 1894. Price $1.50. Pp., 223.

The purpose of this handsome little book is "to connect some leading aspects of democratic citizenship with ethical facts and beliefs." The nine essays constituting it are called: "The Equality of Men," "Fraternity," "'The Rights of Man,'" "Citizenship," "The Rule of the Majority in Politics," "Party and Political Consistency," "Democracy and Character," and "Some Economic and Moral Aspects of Luxury." "In *The Equality of Men* justification is sought for the be- "stowal upon the citizen of civil and political rights, as well as for the increased "attention given of recent years to questions relating to the distribution of wealth; "and this justification is found, not in the untenable doctrine that men are equal, "but in the fact recognised alike in moral and in religious experience, that the "humblest member of the community possesses a spiritual worth which effectually "parts the man from the chattel and the animal.

"The same idea is applied in *Fraternity* to a consideration of the nature of "social ties. Powerful as are the forces which make for individualism, and even "for the disintegration of society, these, it is contended, find a final limit in that "mutual respect and sympathy which arise between man and man, as soon as each

"begins to recognise in his neighbor that principle of moral life which he feels "bound to acknowledge and prize as his own highest endowment. It is on Equal- "ity and Fraternity, as thus interpreted, that democratic citizenship is, in these "pages, held to rest; and it is to realise these fundamental ideas that it is justified "in becoming practical.

"No attempt," the author says, "is made to discuss in detail the manifold "ways in which a complete and satisfying citizenship may be realised. But two "aspects seem to demand special attention. The one concerns the citizen's atti- "tude to the Majority, through which a democracy expresses its will; and the "other his relation to Political Party, as the recognised instrument by which con- "viction finds effective enactment."

The essay "*Democracy and Character* is an attempt to estimate the influences "which a democratic form of society, especially when it is commercial and indus- "trial, tends to exercise upon moral character. It is not denied that there are rea- "sons for misgiving and apprehension; but, as against these, grounds for confi- "dence are sought, firstly, in the fact that there is already so much in democratic "development to strengthen the belief in the worth and possibilities of men; and, "secondly, in the hope that the spirit of Democracy, rightly understood, will find "an unfailing ally in Religion." The considerations advanced in the last essay, *Some Aspects of Luxury*, are unique and deserve consideration. The ease, soberness, and moderation of Professor Maccunn's utterances win from the start the reader's interest. *μ.*

OUR NOTIONS OF NUMBER AND SPACE. By *Herbert Nichols, Ph. D.* Boston: Ginn & Company. Pp., 201. 1894.

To quote his own words, Mr. Nichols's thesis is this: "Our brain habits, with "the modes of thought and of judgment dependent thereon, are morphological re- "sultants of definite past experiences: our experiences, and those of our ancestors. "Each limited experience does its share toward fixing a limited habit. The ex- "periences most common to our various regions of skin, differ widely one from "another; those of the tongue, from those of the fingers; those of the fingers, from "those of the abdomen, and so on. Our habits of judgment, based on these sev- "eral avenues of experience, ought therefore, when compared with each other, to "betray permanent characteristics running parallel with the local differences of "anatomy, of function, and of experience, which gives rise to them, and in which "they are rooted. Investigation proves this to be the case. It shows that our "judgments of the same outer facts, such as of number and of distance, vary greatly "when mediated by different tactual regions. And what is of greater importance "to the science of psychology, these variations in judgment bear distinguishing "ear-marks of the kinds of experience out of which, and by reason of which through "life, they have slowly risen,"

The results of his investigations Mr. Nichols formulates in 109 short para-

graphs. Owing to their number, and the abstract form of their expression, we shall quote only the concluding paragraph, which may give the reader an idea of what Mr. Nichols has aimed at and done: "The origin and foundation of our thesis "must be fundamentally placed in the following law: Presentations of Number, of "Distance, and of all Spatial Figures and arrangements in general, are alike based, "primarily, upon serial events differing greatly in mode, such as become charac- "teristic of those modes of presentation which we call numerical, extential and "spatial, but all of them governed by the same fundamental laws of relationship. "By reason of this, *all simultaneous presentations are dependent upon, and expres- "sive of, the several modes of serial occurrence out of which, through life, they have "evolved, and become differentiated.* From the simplest presentations to the most "highly developed functions of judgment, we find this same system of laws articu- "lated everywhere into one common Genetic System of Mental Development." *μ.*

THREE LECTURES ON THE VEDÂNTA PHILOSOPHY. Delivered at the Royal Institution in March, 1894, by *F. Max Müller*, K. M., Member of the French Institute. London and New York: Longmans, Green, & Co. 1894. Pp., 173. Price, $1.75.

Few writers surpass Prof. F. Max Müller in popular exposition. Rigid professional scholars sometimes object to his artifices, but their cavils rarely reach or influence that portion of the world which he addresses. Whatever their short comings, perhaps they have none, the purpose of the present three lectures is well served. What the general reader wants is not painfully and correctly elaborated details, but a general impression or picture of things and events. If he reads this little book of Prof. Max Müller's he will certainly get that. The Professor's easy, confident style leaves no doubts in the trustful mind, and we take from his books those warm, living pictures of his subjects which it is his laudable ambition to convey. *μκρκ.*

HYPNOTISMUS UND SUGGESTION. Eine klinisch-psychologische Studie. By *Prof. Dr. Moriz Benedikt.* Leipsic and Vienna: M. Breitenstein. 1894. Pp: 90. Price, 2 Marks.

This lively little pamphlet is the latest contribution to the acrimonious controversy which is now being waged between Professor Krafft-Ebing and Professor Benedikt anent the former's reputed discovery of a medium, a lady thirty-three years old, who can be put back by hypnosis into earlier periods of life and be made to act the character of that period with a consistency far beyond the powers of recollection. (See *The Monist*, Vol. IV, No. 1, page 156.) It is a very instructive piece of polemic, and should be read by all persons engaged in hypnotic and psychiatrical studies. Only one chapter or part is nominally devoted to "the development of Krafft-Ebing's psychological equation," but its forcible resolution gives color to the whole work. Professor Benedikt assures us, however, that he has a moral aversion to personal polemics, and undertakes the execution of Professor Krafft-Ebing only

from scientific necessity. His remarks about the method of medicine are excellent and worthy of close consideration. Especially does he insist on the necessity of mathematics and mechanics as a propædeutic to such researches. The question with whose solution the work is ostensibly concerned is the fabrication and development of mediums. The results are: (1) Post-hypnotic actions, where they are not rank comedy, are conditioned by the emergence of memories from the hypnotic state possessed of the full intensity of real perception-memories; (2) in the somnambulic state memories of former somnambulic states arise, and if they have the same or a similar purport, mutually complement one another, so as to form a whole; (3) memories of the waking state are carried into the somnambulic state, and influence conduct in the same; (4) these memories of the waking state sharpen the attention in the somnambulic state and produce a certain consistency and system of conduct which is lacking in ingenuous subjects. In fact, anticipated attention at the beginning of the experiment can actually transform the somnambulic state into a normal conscious state. With respect to the personal strictures of this pamphlet, it remains to be seen what Krafft-Ebing will reply. *μκρκ.*

ZUR LEHRE VOM INHALT UND GEGENSTAND DER VORSTELLUNGEN. Eine psychologische Untersuchung. By *Dr. Kasimir Twardowski.* Vienna: Alfred Hölder. Pp., 111. 1894.

The purpose of this investigation is to establish and examine the differences between mental presentations where they relate simply to the contents of presentation and where they serve as the designation of objects. The remarks of the author are instructive and show well the current confusion of psychological terms. Everything that is presented, or, as we may say, conceived, by presentation, be it what it may, is called object (*Gegenstand*). The objects are either real or not real. They are either possible or impossible. They exist or do not exist. Their common attribute is that they can be or are the object of psychical acts, that their verbal designation is the name, and that regarded as a class they form the *summum genus*, which finds its usual spoken expression in the word "something." The images, percepts, or ideas which correspond to class-notions are single objects, in the sense defined, and different from the objects of the individual percepts belonging under the class-notion. The character of the act of presentation, the contents of the presentation-images, or class-images, individual images, and the manifold relations of the presentation-continuum, as Mr. Ward calls it, are discussed—in a manner which may be gleaned from the above brief remarks. *μ.*

DIE ETHIK DES STOIKERS EPICTET. By *Adolf Bonhöffer.* Stuttgart: Ferdinand Enke. Pp., 275. 1894.

In a previous work, *Epictet und die Stoa* (Stuttgart, 1890), Mr. Bonhöffer pointed out the essential dogmatical agreement between Epictetus and the Stoics, showing the importance of that philosopher for the history of many imperfectly understood

Stoic ideas. What in that volume was done for psychology and the theory of knowledge, the author here proposes to do for ethics. Mainly, however, it is an independent exposition and deals rather with the ethics of Epictetus as an individual philosopher, than with his relations with the Porch. To copious notes the author has added an excellent classified index—a rare sight in a German work, but one which makes the present production exceedingly handy as a volume of reference. In an Appendix, the author treats at length (90 pages) of Stoic ethics proper, though with no claim to exhaustiveness. Mr. Bonhöffer's work gives one the impression of care and thoroughness, and his expositions place in a clear light the historical importance of Epictetus's ethical ideas, as well as their relationship with the views of the great philosophers and with Christianity. *μ.*

WAS WILL DER KRITISCHE REALISMUS? Eine Antwort an Herrn Professor Martius in Bonn. By *Hermann Schwarz.* Leipsic: Duncker & Humblot. Pp., 40. Price, 1 mark. 1894.

Mr. Schwarz is the author of a work entitled *Das Wahrnehmungsproblem vom Standpunkte des Physikers, des Physiologen und des Philosophen* (1892). Recently, Herr Professor Martius of Bonn "recensed" the *Wahrnehmungsproblem* in the *Göttinger Anzeigen*, but his recension shot so wide of the mark that, to judge from Mr. Schwarz's statement, he must have aimed at a different book, or had in his eye some other philosophical system. Hence, Mr. Schwarz writes this brief pamphlet to tell Professor Martius what his system is. Readers of the *Wahrnehmungsproblem* will, no doubt, be glad to have this explanation of Mr. Schwarz. *μ.*

DIE PHILOSOPHIE DER FREIHEIT. Grundzüge einer modernen Weltanschauung. By *Dr. Rudolf Steiner.* Berlin: Emil Felber. 1894. Pp. 242.

The essential characteristic of the present age the author finds in the evident striving of individual culture to make itself the centre of all the interests of life. To bear the stamp of validity, a thing must have its origin deep in the roots of individuality. This, in a certain form, is the gospel of the development from within outwards which Goethe championed. Between heredity, tradition, iron-clad custom, and the independent mind filled with new ideas, a constant battle is fought—the battle of knowledge against belief. Man, however, must not bow to the new idea lest he be what he was before, but must make himself master of it. The ground or reason for the translation of an idea into actual reality by the agency of the individual man can be found only in the man himself. For an idea to become an act, a man must *will* its transformation. But such a volition can spring solely from man himself. Man is the ultimate mover of his acts; *he is free.* *μκρκ.*

DOLORE E PIACERE, STORIA NATURALE DEI SENTIMENTI. By *G. Sergi.* Milan: Dumolard. 1894. (Pp., xv and 395; price, lire 4.50.)

Grief and Pleasure is an attempt to demonstrate scientifically the correctness of the popular belief that the region of the heart is the seat of the feelings; that

grief and pleasure do not originate where thought is developed, but are alterations of the functions of organic life rendered apparent through the agency of the medulla oblongata. This, then, is the centre of grief and pleasure, whether provoked by organic, physical, sensible stimulus in any part of the body, or by perceptions, ideas, thoughts, transmitted through the brain. It is from here that the impulses proceed that modify and disturb the organic life, beginning with the heart and the respiration.

The author presents many proofs of this theory, but warns us that as the theory and the book were each a long slow growth neither can be understood or appreciated till the whole book has been read. He finds suggestions of this theory in the writings of Hack Tuke, Brown-Séquard, Laycock, Spencer, Hall, James, and Monselice, and additional evidence at the last moment in the work of Dr. Mosso on *The Temperature of the Brain* (Milan, 1894). This last curious collection of studies shows that the temperature of the brain is not increased by thought, but is by the emotions, a fact that our author explains by his theory: because in the generation of thought all the energy of the brain goes in that direction, while in the transmission of the emotions from their independent centre to the brain, the seat of thought, there is an excess of energy which is transformed into heat.

The book, written by a well-known Italian author, is curious and interesting. The chapters are: Introduction: General Characteristics of Psychic Phenomena. Chapter I. Irritability and Sensibility. II. Sensation. III. Grief and Pleasure. IV. Emotions. V. Physical Bases of the Emotions. VI. Mechanism of the Emotions. VII. Genesis of the Emotions. VIII. Genealogy of the Emotions. IX. Moral Sentiments. X. Psychological Synthesis of the Emotions. XI. Physiognomy. XII. Influences and Variations. XIII. Pathology of the Emotions. XIV. Æsthetic Sentiments. XV. Origin of the Æsthetic Sentiments. XVI, XVII. and XVIII. Analysis of the Æsthetic Sentiments. XIX. Religious Sentiment. XX. Evolution of the Sentiments. G. C. H.

Lo Scetticismo e Gaetano Negri. By *G. Morando.* Milan: Cogliati. 1894. 1 Lire. Pp. 100.

This volume is the development of an article published in the *Rassegna Nazionale*, the journal, according to Negri, "which is the most authoritative expression of that Catholicism which would be at the same time orthodox, progressive, and national." It was called forth by the publication of *Rumori Mondani*, the last work of Senator Negri, and is an attempt to state and then to refute the materialistic or agnostic principles and theories contained in this and preceding works of the author of "George Eliot." Morando arms himself with the weapons of Plato, the Fathers of the Church, and Rosmini, to combat Aristotle, Kant, and their disciple Negri, and sufficiently indicates his endeavor after fairness by the two mottoes which he recommends: "To those rationalists who struggle in vain in the strait-jacket of their doubts, I say—The truth shall make you free. To those believers

who may be unjust to the truth for vain human reasons, I say—Freedom shall make you truthful. The former are vital words of Christ, the latter a profound and worthy inversion of them." G. C. H.

KANT'S INAUGURAL DISSERTATION OF 1770. Translated into English by *William J. Eckoff*. Professor of Philosophy and Pedagogy in the University of Colorado. New York: Columbia College. May, 1894. Price, 90 cents. Pp, 101.

The second number of the first volume of the "Columbia College Contributions to Philosophy, Psychology, and Education," the purpose of which we spoke of in our last issue, consists of an English translation of Kant's inaugural dissertation, *De mundi sensibilis atque intelligibilis forma et principiis*, of a general historical introduction, and of a discussion of the position of the *Dissertation* in Kant's critical system. It is as refreshing as it is rare to see the broad view which the editor of the translation takes of the relations of philosophy with the practical religious and social problems of the day, and to note the commendable zeal with which he attacks his subjects. It is his conviction that Kant can best be understood, not by the utilisation of his numerous commentators, but by calling on Kant personally to explain himself. Mr. Eckoff proposes, accordingly, as part of his plan for eliciting the responses of the master, to prepare a series of monographs covering the field of the pre-Critical work of Kant in Kant's own language, "with no more additions from the writer than would suffice for connective tissue." The present paper is a part of this larger plan. The *Dissertation* is claimed as the turning-point in the development of the philosophy of Kant. According to Professor Windelband the *Dissertation* belongs to the pre-Critical period. On this point Mr. Eckoff takes issue with Professor Windelband, and from the discussion, the unprejudiced reader will be led, we think, to take Mr. Eckoff's side. Typographically, the volume is not exemplary. Half the time, the use of quotation marks is discarded, causing the reader considerable annoyance. μ.

RICHARD CUMBERLAND ALS BEGRÜNDER DER ENGLISCHEN ETHIK. By *Frank E. Spaulding*. Leipsic: Gustav Fock. Pp., 101. 1894.

A dissertation presented to the faculty of the University of Leipsic for the degree of Doctor of Philosophy. It is the first monograph, the author states, which has been published on Cumberland. It gives a sketch of that philosopher's life, character, and works, and is clearly written. μ.

PERIODICALS.

THE PSYCHOLOGICAL REVIEW. VOL. I. NO. 4.

REVERSE ILLUSIONS OF ORIENTATION. By *Alfred Binet*.—DIRECT CONTROL OF THE RETINAL FIELD. By *George Trumbull Ladd*.—PSYCHOLOGICAL NOTES ON HELEN KELLAR. By *Joseph Jastrow*.—PSYCHOLOGY PAST AND PRESENT. By *J. Mark Baldwin*.—DISCUSSION, ETC.—(New York and London: Macmillan & Co.)

By "reverse illusions of orientation" (*le renversement de l'orientation*) M. Binet understands "illusions or hallucinations of orientation which arise spontaneously either when we waken in the darkness of night, or during the day when awake. . . . Generally the illusion is equivalent to the effect of a rotation of 180°: hence the impression of a turning or 'reversal.' . . . We still need to know whether the illusion is produced or not by a particular derangement of one sense-organ—possibly the semicircular canals of the inner ear. In experimental studies that have been made on the sensation of vertigo, no one has, to my knowledge, produced such illusions of the orientation of objects."

Psychological students will be well repaid by a perusal of Professor Baldwin's review of "Psychology Past and Present."

THE PHILOSOPHICAL REVIEW. Vol. III. Nos. 4 and 5.

THE FREEDOM OF THE WILL. By *Prof. Frank Thilly*.—THE MORALITY THAT OUGHT TO BE. By *Alfred L. Hodder*.—AFFECTIVE ATTENTION. By *Prof. E. B. Titchener*.—GERMAN KANTIAN BIBLIOGRAPHY. By *Dr. Erich Adickes*.

THE EXTERNAL WORLD AND THE SOCIAL CONSCIOUSNESS. By *Prof. Josiah Royce*.—THE PROBLEM OF HEGEL. By *Prof. John Watson*.—EPISTEMOLOGY AND ONTOLOGY. By *Prof. Andrew Seth*.—GERMAN KANTIAN BIBLIOGRAPHY (ix). By *Dr. Erich Adickes*.—BOOK REVIEWS.—(Boston, New York, Chicago: Ginn & Co.)

Professor Royce's article is a lecture read before the Philosophical Club of Princeton College, forming an introduction to a somewhat extended line of research.

John Watson breaks a lance for Hegel, bringing him nearer to the comprehension of modern readers by insisting that the only Absolute which is thinkable at all is an Absolute which is manifested in the Relative and which, therefore, has no reality apart from its manifestations. The world, accordingly, in its multifarious energies, whether as nature or as mind, is the expression of a self-determined unity.

Prof. Andrew Seth makes a few comments on Mr. Ritchie's article "The Relation of Metaphysics to Epistemology" in order to remove some of that writer's

misconceptions. An elaborate reply Professor Seth thinks no longer necessary, after having answered most of the points by anticipation in his article "Hegelianism and its Critics" in *Mind*, and in "Epistemological Conclusions" in the *Philosophical Review*.

Professor Thilly trusts that determinism is not, as has been claimed, a discouraging or paralysing doctrine. It does not destroy the energy of action. Fatalistic nations like the Mohammedans were far more energetic than Christian ascetics who believed in the will's absolute freedom.

THE NEW WORLD. Vol. III, Nos. 9 and 10.

LOTZE'S DOCTRINE OF THOUGHT. By *Henry Jones*.—THE HUMAN ELEMENT IN THE BIBLE. By *Philip S. Moxom*.—UNIVERSALISM A PROGRESSIVE FAITH. By *A. N. Alcott*.—THE SONG OF SOLOMON. By *Karl Budde*.—THE ORIGIN OF GOODNESS. By *Minot J. Savage*.—THE PROBLEM OF PARACELSUS. By *Josiah Royce*.—THE ANTE-NICENE DOCTRINE OF THE UNITY OF GOD. By *Thomas R. Slicer*.—DEAN STANLEY AND THE TRACTARIAN MOVEMENT. By *A. V. G. Allen*.—BOOK REVIEWS.

BAUR'S NEW TESTAMENT CRITICISM IN THE LIGHT OF THE PRESENT. By *H. Holtzmann*.—JOHN KELPIUS, PIETIST. By *F. H. Williams*,—THE MOVEMENT FOR RELIGIOUS EQUALITY IN ENGLAND. By *Edward Porritt*.—THE RELIGIOUS AND THE HISTORICAL USES OF THE BIBLE. By *Frank C. Porter*.—THE EPISCOPALIAN POLITY. By *W. Kirkus*.—THE PAULINE TEACHING OF THE PERSON OF CHRIST. By *Orello Cone*.—THE SIGNIFICANCE OF PESSIMISM.—By *R. A. Holland, Jr.*—DEMOCRACY AND THE POET. By *Nicholas P. Gilman*.—THE BOOK OF JOB. By *Bernhard Duhm*.—BOOK REVIEWS.—(Boston: Houghton, Mifflin & Co.)

As far as New Testament criticism is concerned the plea and the counter-plea, the accusation and the vindication of "Baur's New Testament Criticisms" may be put briefly and appropriately in these two propositions: "Baur was a negative spirit, who left nothing standing as genuine and apostolic in the New Testament except four epistles of Paul and the Johannine Apocalypse, and so gave a signal for general destruction";—"Baur was a positive spirit, since he was by no means satisfied with denying to a Biblical writing the authorship ascribed to it by tradition or named in the superscription, but claimed emphatically to practise 'positive criticism,'—to show the place which the various writings of the New Testament held in the general development of Christianity, and in which they are historically comprehensible." Professor Holtzmann adds: "Since Baur fulfilled this promise, he has brought the original condition of primitive Christianity into the light of historical probability. Historians and theologians have once more a common ground on which they can discuss the origin of Christianity. Since he helped to prepare this for them, Baur was a discoverer, a pathfinder, and a pioneer in the best sense of the word."

PHILOSOPHISCHE MONATSHEFTE. Vol. XXX. Nos. 3, 4, 5, and 6.

SUBJECTIVE KATEGORIEN IN OBJECTIVEN URTHEILEN. By *Th. Lipps*.—THEORIE DER TYPEN-EINTHEILUNGEN. (II.) By *B. Erdmann*.—PSYCHOLOGISCHE STUDIEN ZUR ELEMENTAREN LOGIK. (I.) By *E. G. Husserl*.

ETHISCHER RIGORISMUS UND SITTLICHE SCHÖNHEIT. Mit besonderer Berücksichtigung von Kant und Schiller. I. By *K. Vorländer*.—AUSSICHTEN DER EXPERIMENTELLEN PSYCHOLOGIE. By *O. Külpe*.—VON DER UNSTERBLICHKEIT

DER SEELE. By *A. Spir.*—DE RERUM NATURA. By *P. Carus.*—LITTERATURBERICHT. (Berlin: Georg Reimer.)

Lipps's article on "Subjective Categories in Objective Judgments" is a contribution to formal logic in which he enumerates and distinguishes in detail a number of classes of judgment, a proceedure which, as Lipps says, may be tiresome but is not redundant.

Benno Erdmann finishes his "Theory of Type-Classifications," the last of which are types of languages. In the summary he calls attention to the need of recognising in logic, besides distinctly defined types, also such as stand in fluxional connexion, which may, but need not be, continuous. The whole whose parts stand in a fluxional connexion need not be a species but may be an individual object. It may be the development of a single concept. The field of divisions having a fluxional connexion is not only to be sought in the natural sciences but extends over all our practical and theoretical knowledge.

Husserl discusses in his "Psychological Studies of Elementary Logic" the distinction between abstract and concrete, and treats of *Anschauungen* and representations.

Vorländer discusses Kant's ethical rigorism as contrasted with Schiller's criticism, whose ethical ideal was æsthetically softened by his ideal of beauty.

Külpe reviews the progress of experimental psychology and calls attention to its importance.

A. Spir's "Immortality of the Soul" is a translation from the French of a posthumous work of the author. According to the statement of his daughter, the late Mr. Spir valued it greatly as his confession of faith. The article is remarkable in so far as Spir rejects the belief in individual immortality which to him is the summit of egotism, forming a natural contrast to moral sentiment. He points out, however, that men naturally cherish the confidence that their existence is not due to a mere accident, but is such as it is according to an eternal decree. This confidence is the vital basis of all religion. But it is commonly confused with the animal instinct of the preservation of self, which mixture produces the belief in an immortality of the conscious ego. Mr. Spir proceeds to show that the existence of man's ego is an illusion. It is a mirage hovering over an abyss destined to appear after a short time, and a close investigation proves its emptiness and intrinsic vanity. The cognition of this truth has produced modern pessimism, viz., that view of the world according to which life is without sense and worth. Many thinkers, Spir says, have called attention to the astonishing mixture of greatness and smallness that obtains in human nature, but no one has as yet clearly shown in what consists the greatness as also the ultimate cause of the misery of man. The path to salvation has been shown by the two greatest teachers of mankind, Buddha and Christ. But the doctrines of these masters are not without their defects; especially the doctrine of Christ (at least as it is taught in the Christian churches) is distorted by a belief in the immortality of the conscious ego, which is incompatible with salvation and the resignation of egotism. Spir has much to say about the Absolute and the impassable abyss between absolute and physical nature,—a theory which seems to imply an irredeemable dualism; but we do not intend to enter into a criticism of this part of his theory. Suffice it to summarise the main results of his argument which is morally sound and characterises his deep insight into the religious problem. He says, in order to escape from the vanity of life and secure immortality, in order to partake of the absolute and eternal life, one must resign oneself, that is, one's conscious ego, which is empty and illusory, and must identify oneself with one's true ego, with the normal

nature of things which is already defined, and with the eternal, by consecrating one's life to the good and the true. In theory most men are incapable of understanding self-resignation. They cannot overcome their natural egotism based upon their illusion of possessing an absolute ego. . . . Therefore, they desire a conscious immortality and try to believe in it. Happily, however, men are in practical life capable of performing many things, the theory of which they do not know. A tight-rope walker, for instance, could not explain mathematically the motions which he executes on the rope to keep his equilibrium, nor can the billiard expert offer a scientific demonstration of the strokes he makes; but their ignorance does not prevent their success. The same is true in religion. In theory most men are incapable of understanding the resignation of their egoity, yet in practical life self-resignation is not at all rare. . . . Give to a man a great cause and he will find it natural to sacrifice himself for it, yet will he, if the matter be left to his investigation, be incapable of comprehending the possibility or the advantages of his sacrifice which will accrue to his ego. Men possess the intrinsic sentiment that their true ego must not be sought in their conscious ego. Nevertheless they will find it difficult to form a clear idea of it.

De Rerum Natura, by Dr. Paul Carus, is a poetic expression of a world-conception based upon the same view as that of Spir's article, and the editors, Drs. Benno Erdmann and Paul Natorp (the first of Halle, the latter of Marburg), have purposely placed both contributions side by side in the same number. The editors wrote to the author, when he offered them his poem for publication, that poetry, according to their strict rules, was excluded from the *Philosophische Monatshefte*, but that under the present circumstances they would gladly make an exception. We do not intend here to enter into further details, but hope to be able to present to our readers a good English translation of the poem, which Mr. Charles A. Lane has promised to furnish.

THE AMERICAN JOURNAL OF PSYCHOLOGY. Vol. VI. No. 3.

STUDIES IN THE PSYCHOLOGY OF TOUCH. By *F. B. Dresslar*.—ON THE DIFFERENCE SENSIBILITY FOR THE VALUATION OF SPACE DIFFERENCES WITH THE HELP OF ARM MOVEMENTS. By *A. E. Segsworth*, B. A.—MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF CORNELL UNIVERSITY. By *R. Watanabe*, Ph. M., *H. W. Knox*, A. B., *M. F. Washburn*, A. M.—ACCURATE WORK IN PSYCHOLOGY. By *E. W. Scripture*, Ph. D.—SOME PSYCHOLOGICAL ILLUSTRATIONS OF THE THEOREMS OF BERNOULLI AND POISSON. By *E. W. Scripture*.—THE RELATION OF THE INTERFERENCE TO THE PRACTICE EFFECT OF AN ASSOCIATION. By *John A. Bergström*.—PSYCHOLOGICAL LITERATURE. (Worcester, Mass.: J. H. Orpha.)

INTERNATIONAL JOURNAL OF ETHICS. Vol. IV. No. 4.

NATURALISM AND ETHICS. By *Right Hon. A. J. Balfour*.—EFFECT OF THE CLERICAL OFFICE UPON CHARACTER. By *Rev. Langdon C. Stewardson*.—RELIGIOUS SENTIMENT AND THE MORAL PROBLEM IN ITALY. By *Giacomo Barzellotti*.—THE LIMITS OF CASUISTRY. By *Rev. Hastings Rashdall*.—PRACTICAL ETHICS. By *William Knight*.—THE PUNISHMENT OF CHILDREN. By *M. M. Mangasarian*.—DISCUSSIONS.—BOOK REVIEWS. (Philadelphia: International Journal of Ethics, 118 S. Twelfth Street.)

The Rt. Hon. Mr. Balfour lays down in his article, "Naturalism and Ethics," two propositions: "(1) that practically, human beings being what they are, no

moral code can be effective which does not inspire, in those who are asked to obey it, emotions of reverence, and (2) that practically the capacity of any code to excite this or any other elevated emotion cannot be wholly independent of the origin from which those who accept that code suppose it to emanate."

Mr. Langdon C. Stewardson believes that "the evils of the patronage to which the holders of the clerical office are exposed are abundantly manifest. Now, as always, they are self-seeking, time-serving, the destruction of mental integrity and moral courage, together with the loss of that pure and lofty spirit of unworldliness which is of the essence of the kingdom of heaven." Yet he grants that there are many who conscientiously avail themselves of their exceptional opportunities for high and lofty thought, as well as the rare chances for the doing of good.

Giacomo Barzellotti describes the situation of his native country, saying that "the regeneration of the popular conscience and of Italian life cannot be accomplished without harmonising the modern spirit with the moral traditions of Christianity."

Mangasarian defines punishment as directing disobedience to its natural result —pain. He demands that every shortcoming of the child should be traced to its beginnings, and regarding the abuse of punishment as more dangerous than the greatest indulgence, objects to corporal and terrifying punishments, such as shutting up a child in a dark room. Punishment, he says, should be of such a nature that, if necessary, the parents can share it with the children.

MIND. NEW SERIES, No. 11.

MEDIATE ASSOCIATION. By *W. G. Smith.*—MR. BRADLEY'S VIEW OF THE SELF. By *J. S. Mackenzie.*—MR. BRADLEY AND THE SCEPTICS. By *Alfred Sidgwick.*—DEFINITION AND PROBLEMS OF CONSCIOUSNESS. By *A. Bain.*—DISCONTINUITY IN EVOLUTION. By *Francis Galton.*—DISCUSSIONS, ETC. (London and Edinburgh: Williams & Norgate.)

Prof. A. Bain thinks of consciousness as Hamilton does of individuals that it cannot be defined, or, as the old logicians said, that a view of the thing itself is its best definition. Consciousness, Bain says, is remarkably free from ambiguity, yet it becomes involved in a number of subtle and difficult problems. Instead of a definition he gives the following explanation: "Consciousness," he says, "means only that the mind is alive and at work in some of its manifestations and not in suspense or dormant." He then proceeds to discuss in brief paragraphs the "Object of Consciousness," "Truths of Consciousness," "Consciousness in Contrast to Mind," "The Conscious Area," "Consciousness as Essential to Memory," "Immediate Physical Conditions of Consciousness," "Reflex Actions and Consciousness: Animal Automatism," "Consciousness and Self-Consciousness"; winding up with the remark that the critical examination of the compound self-consciousness "readily gets beyond the pale of psychological adjustment."

PHILOSOPHISCHES JAHRBUCH. Vol. VII. Nos. 2 and 3.

SIND DIE CHEMISCH-PHYSIKALISCHEN ATOME NUR EINE FICTION? By *Linsmeier, S J.*—WIDERSTREITEN DIE WUNDER DEN NATURGESETZEN, ODER WERDEN LETZTERE DURCH DIE ERSTEREN AUFGEHOBEN? (Concluded.) By *Pfeifer.*—UEBER DEN PLATONISCHEN GOTTESBEGRIFF By *Nassen.*—DER GRUNDPLAN DER MENSCHLICHEN WISSENSCHAFT. (Concluded.) By *Bahlmann, S. J.*—HANDSCHRIFTLICHFS ZU DEN WERKEN DES ALANUS. (Concluded.) By *Baeumker.*

UEBER DEN URSPRUNG DER SPRACHE. (Concluded.) By *Gutberlet.*—DIE ARISTOTELISCHE MATERIALURSACHE. By *Reitz.*—ZU KANT'S SCHRIFT: "DIE RELIGION INNERHALB DER GRENZEN DER BLOSSEN VERNUNFT." By *Schirotzky.*—DR. AL. SCHMID ÜBER DIE ERKENNTNISSLEHRE. By *S. J. Tilm. Pesch.*—RECENSIONEN, ETC. (Fulda: Fuldaer Actien-Druckerei.)

Dr. Gutberlet, editor of the *Jahrbuch*, concludes his articles on the "Origin of Language," but not being in need of Darwinism either in theology, natural science, or in philology, he appears to find the problem in the wrong place. Accordingly, his article is disappointing. He states in the conclusion that to the Christian philosopher the solution of the problem is facilitated since it presents itself under the simplest but most important conditions. He knows that man cannot have developed out of the animal kingdom, but is, at least so far as his soul is concerned, immediately called into being by the Creator. Further, he is convinced that an omniscient and all-beneficent God must place his rational creatures in such conditions and must endow them in such a way as to enable them to fulfil their divine mission. For us, education is the God-given mission of leading a human life and reaching our aim. To the first man education must have been replaced by divine endowment and instruction. God must have been his teacher and educator, and it must be expected that under such tutorship the spiritual powers of man would attain a far higher development than we can acquire by learning from our teachers.

Schirotzky, reviewing Kant's "religion within the bounds of pure reason," mainly objects to Kant's idea of the germ of goodness in man, calling attention to the prevalence of the originally latent falseness of the human heart.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. VII. Nos. 2, 3 and 4.

UEBER DEN URSPRUNG DER RICHTIGEN DEUTUNG UNSERER SINNESEINDRÜCKE. By *H. von Helmholtz.*—DAS VERHÄLTNIS VON ACCOMODATION UND KONVERGENZ ZUR TIEFENLOKALISATION. By *Dr. Franz Hillebrand.*—ERKLÄRUNG DER BRENTANOSCHEN OPTISCHEN TÄUSCHUNG. By *F. Auerbach.*—EINE BISHER NOCH NICHT BEOBACHTETE FORM ANGEBORENER FARBENBLINDHEIT (PSEUDO-MONOCHROMASIE). By *Arthur König.*—UEBER DIE INDIREKTE SEHSCHÄRFE. By *Th. Wertheim.*

DIE EMPFINDUNG ALS FUNKTION DER REIZÄNDERUNG. By *W. Preyer.*—DIE WAHRNEHMUNG VON HELLIGKEITSVERÄNDERUNGEN. By *L. William Stern.*—UEBER DIE GÜLTIGKEIT VON NEWTONS FARBENMISCHUNGSGESETZ. By *Emil Tonn.*—ZWEI FÄLLE VON GRÜNSCHEU. By *Dr. Somya.*—LITTERATURBERICHT. (Hamburg and Leipsic: Leopold Voss.)

H. von Helmholtz discusses the origin of the symbolic nature of sense-impressions, comparing them with language. Considering the fact that the words of a language are to some extent arbitrary and varying, while natural events are constant, and bearing in mind how natural to us our vernacular appears, we can readily understand how our sense-impressions can symbolically represent the objects of our experience. Inborn in the organisation are man's reflex motions and impulses. But our concepts are formed under the influence of inductions mainly gained by the unconscious labor of memory.

Hillebrand, a disciple of Prof. Ewald Hering, discusses the problem of the cause of the third extension and the laws according to which it is measured.

F. Auerbach explains Brentano's optical illusions (see *The Monist*, Vol. III,

No. 4) as an erroneous judgment of distances, and details his explanations in additional illustrations.

Arthur König describes an interesting and new case of monochromasy, that is, of almost colorless seeing. The right eye of the patient is emmetropic and very strong, the left eye is hypermetropic. The patient recognises only very strongly colored tints of blue, red, and yellow, but is unable to distinguish between the two latter. The spectrum appears to him in the middle gray, which shows to both sides a weak yellow or blue coloring.

Wertheim investigates the distinctness of indirect vision, presenting the results of his experiments in a diagram.

Preyer comments upon the sensibility to change, discussed by E. W. Scripture in the same journal, by stating that the result of an irritation increases and decreases with the rapidity with which the irritation changes, and with the difference of the limiting values within which the positive or negative fluctuation of the irritation takes place. Sensation is never anything else than a perceived difference of irritation.

Dr. Somya describes two strange cases of chloropy or green-seeing, which he finds can only be due to an extremely delicate change in the chloroidea.

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE. Vol. XVIII. No. 3.

ZUR THEORIE DER NATURWISSENSCHAFTLICHEN BEGRIFFSBILDUNG. By *H. Rickert.*—UEBER SUBJECTLOSE SÄTZE UND DAS VERHÄLTNISS DER GRAMMATIK ZU LOGIK UND PSYCHOLOGIE. By *A. Marty.* (Leipsic: O. R. Reisland.)

ZEITSCHRIFT FÜR PHILOSOPHIE UND PHILOSOPHISCHE KRITIK, Vol. CIV. No. 2.

DAS WELTSYSTEM DES PARMENIDES. By *A. Döring.*—DIE PHILOSOPHIE IN RUSSLAND. (Conclusion.) By *Jakob Kolubowsky.*—KURZE KENNZEICHNUNG MEINES PHILOSOPHISCHEN STANDPUNKTES. By *Gustav Glogau.*—JAHRESBERICHT ÜBER ERSCHEINUNGEN DER PHILOSOPHISCHEN LITTERATUR IN FRANKREICH AUS DEN JAHREN 1891–1893. By *Adolf Lasson.*—RECENSIONEN. (Leipsic: C. E. M. Pfeffer.)

REVUE PHILOSOPHIQUE. Vol. XIX. Nos. 6, 7, 8, and 9.

LES RÈGLES DE LA MÉTHODE SOCIOLOGIQUE. (Second Article.) By *Durkheim.*—LES ACTIONS D'ARRÊT DANS LES PHÉNOMÈNES DE LA PAROLE. By *A. Binet* and *V. Henri.*—SUR LES DIVERSES ACCEPTIONS DU MOT "LOI" DANS LES SCIENCES ET EN MÉTAPHYSIQUE. (Concluded.) By *L. Weber.*—ORIGINES ET CONDITIONS DE LA MORALITÉ. By *Dr. Pioger.*

LA MÉTHODE PHILOSOPHIQUE DE RENAN. By *G. Séailles.*—LES RÈGLES DE LA MÉTHODE SOCIOLOGIQUE (Third Article.) By *E. Durkheim.*—L'IMPRESSION DE L'"ENTIÈREMENT NOUVEAU" ET CELLE DU "DÉJÀ VU." By *Dugas.*—LA PARAMNÉSIE OU FAUSSE MÉMOIRE. By *J.-J. Van Biervlict.*—LA PARAMNÉSIE, D'APRÈS T. VIGNOLI. By *J. Soury.*—LA THÉORIE DE LA CONNAISSANCE MATHÉMATIQUE (MILHAUD, RENOUVIER, H. POINCARÉ, COUTURAT, HUSSERL, ETC.) By *P. Tannery.*

L'ANCIENNE ET LES NOUVELLES GÉOMÉTRIES. III. LES POSTULATS RÉELS DE LA GÉOMÉTRIE EUCLIDIENNE SONT À LA BASE DES MÉTAGÉOMÉTRIES. By *J. Delbœuf.*—INFLUENCE DE L'ÂGE SUR LA MÉMOIRE IMMÉDIATE. By *Bourdon.*—LES

RÈGLES DE LA MÉTHODE SOCIOLOGIQUE. (Fourth and Last Article.) By *E. Durkheim.*

LE PROBLÈME LOGIQUE DE L'INFINI. II. VALEUR ET GRANDEUR. By *G. Mouret.*—L'IDÉE D'AME DANS L'ANCIENNE ÉGYPTE. SA GENÈSE ET SON DEVELOPPEMENT. By *Amélineau.*—DE LA DURÉE DU TEMPS DANS LE RÊVE. By *J. Le Lorain.*—ANALYSES ET COMPTES RENDUS. (Paris: Félix Alcan.)

The *Revue Philosophique* is devoting much space of late to the theory of mathematical cognition. In the July number M. Tannery, whose book on scientific theories has an established reputation, excellently reviews the opinions, recently promulgated, of prominent philosophers and mathematicians. In the August number Professor Delbœuf continues his discussion of the old and new geometries. He claims that all geometries are founded upon the Euclidean, that the meta-Euclidean geometries are not a generalisation but merely an extension of the Euclidean geometry, and it is by this fact that their legitimacy is guaranteed. Finally, in the September number, we have the second part of G. Mouret's article on "The Logical Problem of Infinity," having for its subject "Value and Magnitude."

REVUE DE MÉTAPHYSIQUE ET DE MORALE. Vol. II. No. 4.

SUR LA NATURE DU RAISONNEMENT MATHÉMATIQUE. By *H. Poincaré.*—RENAN DIEU ET LA NATURE. By *G. Séailles.*—L'UTILITARISME ET SES NOUVEAUX CRITIQUES. By *G. Belot.*—SUR LE CONCEPT DU TRANSFINI. By *P. Tannery.*—NOTES CRITIQUES. (Paris: Librairie Hachette & Co.)

In close connexion with the studies referred to above in the *Revue Philosophique*, is here the celebrated mathematician Poincaré's article on "The Nature of Mathematical Reasoning." In mathematics we jump from special cases to general propositions. Is, then, mathematics deductive? Yes, maintains M. Poincaré, because its apparent induction proceeds by a method of reasoning which may be called recurrent. This mathematical induction is different in some respects from physical induction and is possible only in cases where the same operation admits of indefinite repetition, as in the common scale of numbers and in geometrical space-constructions. Because in chess the same operations do not admit of indefinite repetition, this game can never become a science.

THE RIKUGO ZASSI. No. 164, August, 1894.

REFLEXIONS ON SOME RECENT THEORIES OF HEREDITY. By *S. Goto.*—POPE AND SOCIAL PROBLEM. II. By *E. Ono.*—FOREIGN MISSIONARIES. By *K. Ukita.*—REVIEW OF "ATTACKS UPON CHRISTIANITY." IV. By *T. Harada.*—SCHOPENHAUER'S METHOD OF INTERPRETING THE WORLD-PROBLEM. (Concluded.) By *M. Matsumoto.*—BOOK REVIEWS.

A Japanese philosophical magazine, referred to in the Literary Correspondence of the last *Monist*. Printed in the original Chinese.